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LINCOLN MEMORIAL AS IT NOW APPEARS
HENRY BACON, *ARCHITECT*

The Lincoln Memorial in Washington, D.C.

PART II—THE DESIGN

By GLENN BROWN, F.A.I.A.

THE site selected for the Lincoln Memorial terminating a vista, called for a design of magnitude dominating its immediate surroundings. The quiet river which it overlooked required repose and dignity. Its distant connection with the vertical Washington Monument called for a horizontal treatment in design. The peaceful hills of Virginia in the background, varying from the green of summer to the brown and red of autumn and the gray and white of winter, made most fitting a structure light in tone.

The Memorial must present to the imagination an ideal object that would typify the simplicity, dignity and noble life of Lincoln.

The Park Commission, through Charles F. McKim, suggested in their plans an oblong, open portico with its simple and dignified classic columns and entablature. In the view from the east the hills across the river would have been visible through the columns, thus adding to its charm.

Looking from the Capitol on the axis the Memorial forms an interesting exhedra to the Washington Monument, strongly recalling Robert Mills' design for the Washington Monument with its Pantheon. When seen from the axis line in passing along the eastern roadway to Arlington it appears as an appropriate colonnade at the base of the Washington Monument.

One of the most interesting features of the Mall composition is that it will be seen as a whole from such viewpoints as Arlington and the Anacostia Heights, and probably from Mount Hamilton, where we hope to have an adequate Botanical Garden. To obtain and retain these views is important. To achieve this object the best distant views of the Mall, including the Lincoln Memorial, should be sought and opened up where necessary and never allowed to be destroyed by an overgrowth of trees or careless planting. New structures interfering with such views should not be tolerated, as such vistas are the asset to future generations which we should leave unimpaired. Let this generation develop, cherish and leave them intact for the benefit of those to come after us.

One of the most charming views of the Lincoln Memorial has been most seriously marred by the steel truss railway and highway bridges crossing the Potomac. There would be no more effective view of this structure than the one seen by the thousands who get a first view of it coming into Washington by way of the Potomac. Now these bridges cut across and destroy this most important view. These bridges are not only obnoxious because of the effect on the Lincoln Memorial, but because they nullify one of the most important reasons for placing the White House on its present site, which was the

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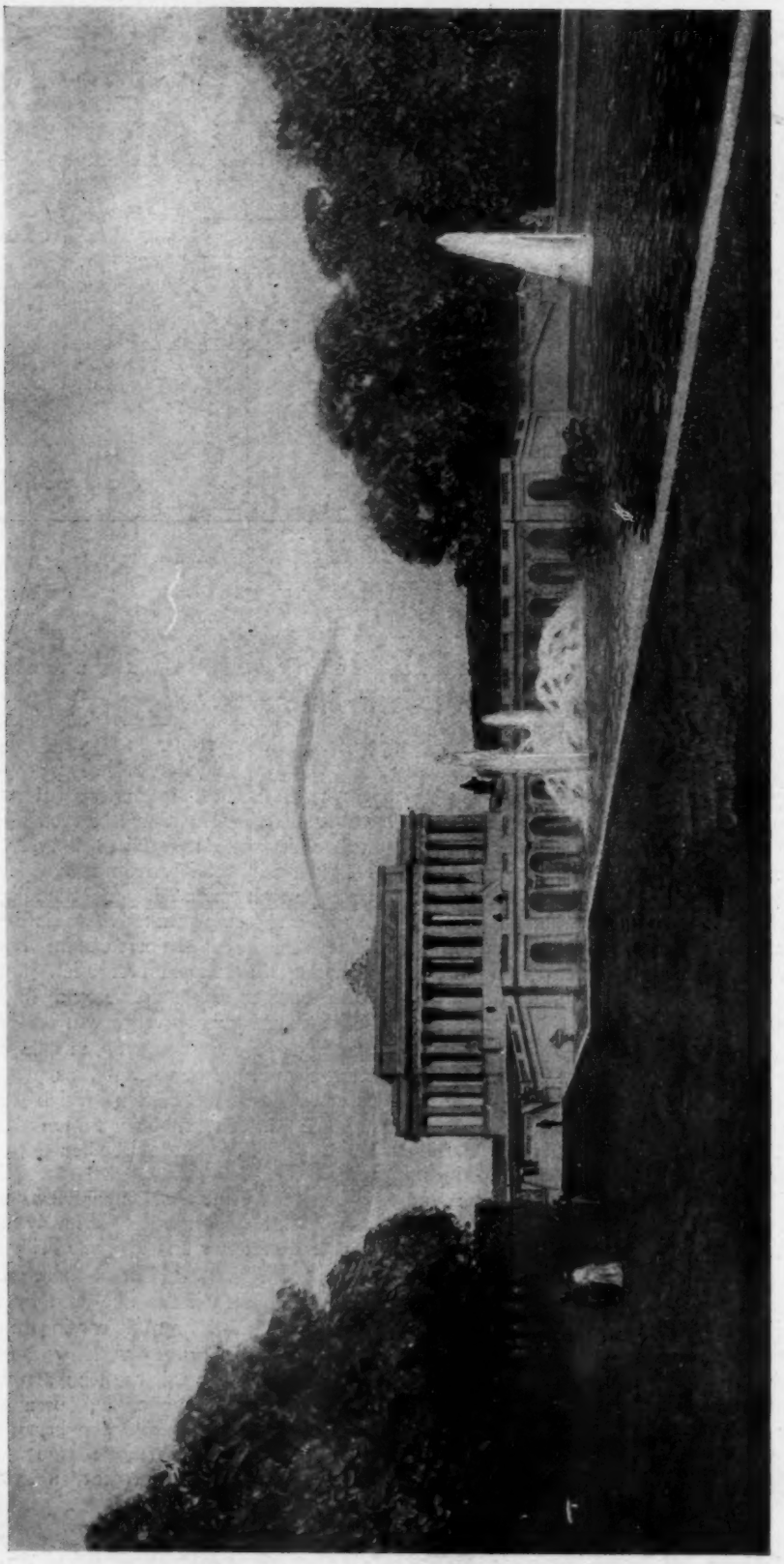
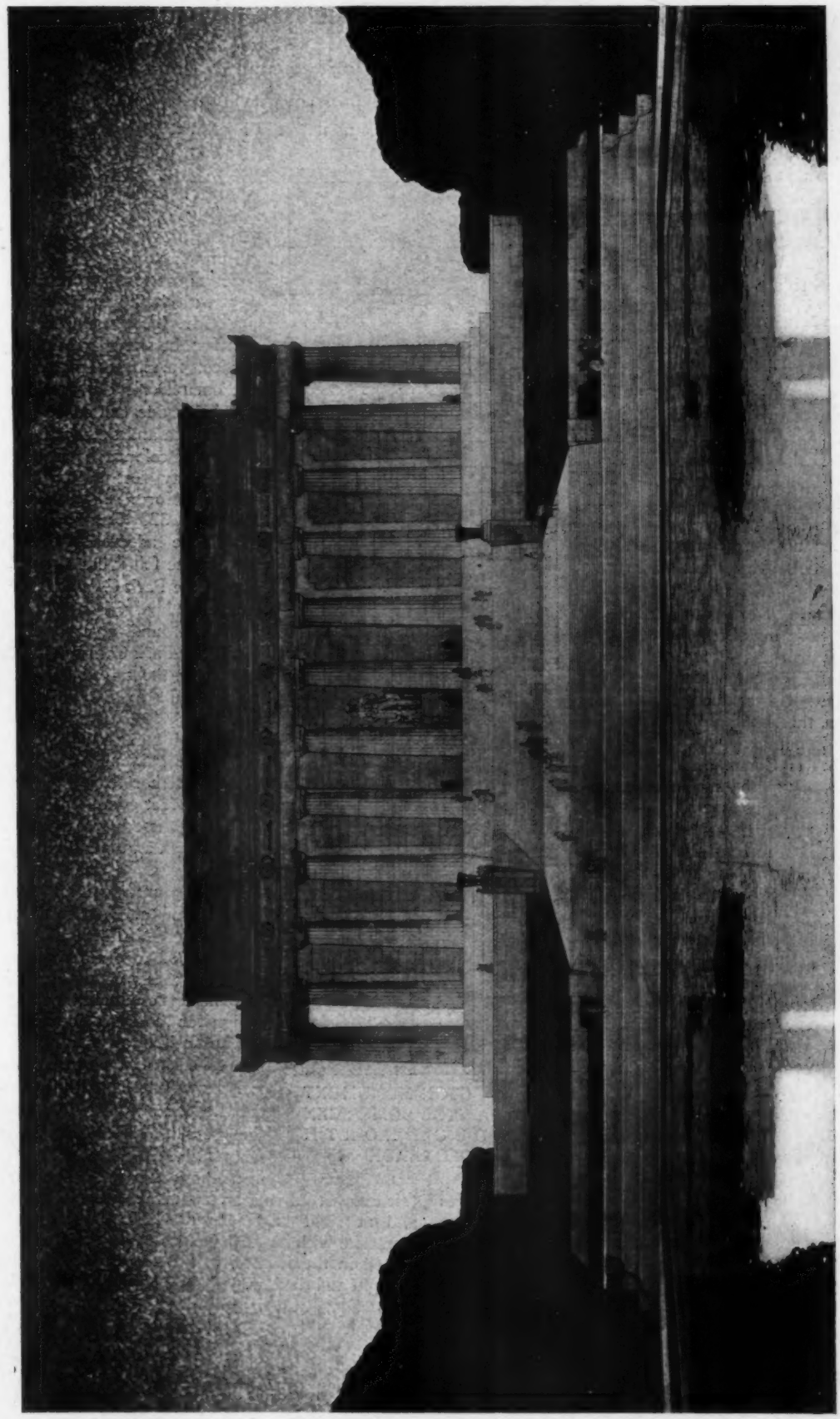


THE PARK COMMISSION DESIGN FOR A LINCOLN MEMORIAL

FIRST SUGGESTION OF A MEMORIAL ON THE PRESENT SITE BY A COMMITTEE COMPOSED OF CHARLES FOLLEN McKIM, DANIEL H. BURNHAM, AUGUST SAINT GAUDENS AND FREDERICK LAW OLMSTED



THE LINCOLN MEMORIAL

PRELIMINARY DRAWING FOR THE PRESENT STRUCTURE
HENRY BACON, *ARCHITECT*

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charming view from the south down the Potomac River.

As Secretary of the Institute it had been my custom in showing foreign architects and artists around the Federal City to call their attention to this satisfying view as one of the reasons for the location of the White House.

These bridges were erected quickly. We had no Fine Arts Commission then. I had not been to the White House during their progress. After their completion I had occasion to take a distinguished Japanese architect to the White House. After describing to him what a beautiful view bound it up with the location of the President's residence, I meant to show it to him. I took him out to the south portico; imagine my chagrin when the stiff, long, ugly steel bridges loomed up as the dominant element, destroying what had for a hundred years given pleasure to thousands. I could only apologize for his and my disappointment. It is fortunate that these bridges are steel and will before many years be replaced by concrete or stone. When this happens, let us hope those in authority, officials and the Fine Arts Commission will have vision enough to build them low; a stone or concrete structure would give a good base line to the Memorial when seen from the river. In this connection the planting and growth of planting on the Potomac Park needs great care. Open views of the important elements of the Mall should be carefully preserved in planting and protection from the overgrowth of planting. Unfortunately several of the important views, one from the White House over the bridges is being finally obliterated by the rapid growth of trees along the railway embankment. The same planting is shutting off views from the river of the Lincoln Memorial. In this connection let us get rid of the temporary structures and semi-temporary structures which mar so disastrously the Memorials to Washington and Lincoln and destroy their beauty of design. Let us hope that the power plant with four huge smokestacks which the authorities proposed to erect almost in the center of the park scheme, permanently destroying its beauty, has been finally if not officially dropped.

Let us not only hope, but keep a perpetual guardianship over these important views from far and near, so that future generations may enjoy the beauties of the design which perpetuates the memory of Lincoln.

WASHINGTON MONUMENT AND CAPITOL DOME SEEN THROUGH NORTH COLONNADE

In the first article I described the selection of the architect which went with the final selection of the site. Mr. John Russel Pope's design for the site showed a circular portico, forming a massive, simple, open Doric Colonnade which guards but does not conceal a quiet central area and the figure of Lincoln. The colonnade was designed to be sixty feet in height on a raised platform, 40 feet above the Potomac, 320 feet in diameter. Mr. Pope adopted the circular form, as he felt it best fitted in the plan of the Park Commission for a great round point from which various roads and approaches lead. While the Park Commission drawings show the radial character of the site, the most important element in the landscape composition is the rectangular area between the Washington Monument and the Lincoln Memorial. The great Lagoon, 200 feet wide and 1,200 feet long, is bounded by English elms on the north and south and by the future terraces of the Washington Monument on the east and the formal steps of the Lincoln Memorial on the west. McKim evidently felt the need of a structure at right angles to this area as forming its most fitting terminal in making the design for the Park Commission.

The feeling of many that the site called for a circular Memorial shows more strongly on the drawings than it will to any one on the ground. I feel that the view from the Washington Monument, or from any point in this area, requires a rectangular structure, dominant and at right angles to the principal axis. The memorial with its formal steps will be beautifully reflected in the Lagoon in the varying conditions of sunlight and shadow.

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WASHINGTON MONUMENT AND LINCOLN MEMORIAL FROM CAPITOL

A charming view marred by war work chimney stacks which should be removed from the Mall

The principal axis, down Twenty-third street, is most fittingly ended by a rectangular memorial.

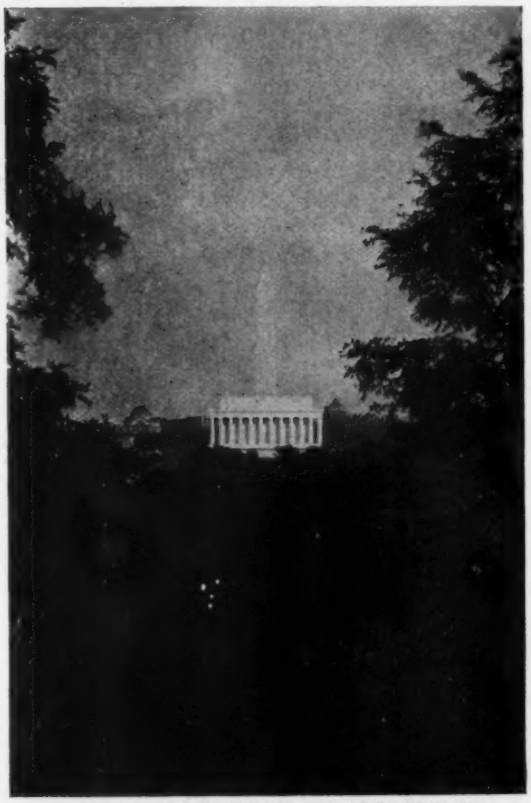
The radial drive over the future Memorial Bridge to Arlington is the only view in which the diagonal view is unhappy, as the roadway leading to Rock Creek is in no sense a radial but a curved, winding drive. The other smaller radials are tree concealed walks or drives.

The architectural features and the planting in the Mall scheme suggest in all their main lines a rectangular treatment and it is fitting that this one of the principal architectural features should conform to the dominant lines of the composition, rather than to the minor lines shown in the radial one to Arlington and the curved one to Rock Creek Valley.

The Park Commission while probably appreciating this fitness in the landscape of the general form suggested by McKim, in making their decision in favor of the Bacon design, do not mention it in their report of March 23, 1912, but rest their case upon the excessive cost of the Pope design. In this final competition as we may call it, Mr. Bacon submitted three designs, one for two large terraces supporting a Doric colonnade representing the United States, a great exhedra, surrounding on three sides a colossal bronze figure of Lincoln facing the Capitol. At the ends of the great colonnade were placed tablets on which were inscribed the two great speeches of Lincoln. This design contemplated a colonnade of 100 feet by 200 feet, with 40-foot columns, two great terraces, the total height from the river being 117 feet. The second design showed a succession of terraces on which was placed a Doric peristyle four columns deep, representing the states. In front of this peristyle and facing the Capitol was placed a colossal bronze statue of Lincoln, and inside the peristyle at the ends, between two of the inner columns, were located tablets with quotations from Lincoln's speeches. This design called for a colonnade 50 feet wide and 240 feet long, columns of 40 feet high and a statue 22 feet high. The total height of the structure from the river was shown as 110 feet.

Of the third design, which was accepted, Mr. Bacon says:

"On the great axis, planned over a century ago, we have at one end the Capitol, which is the monu-



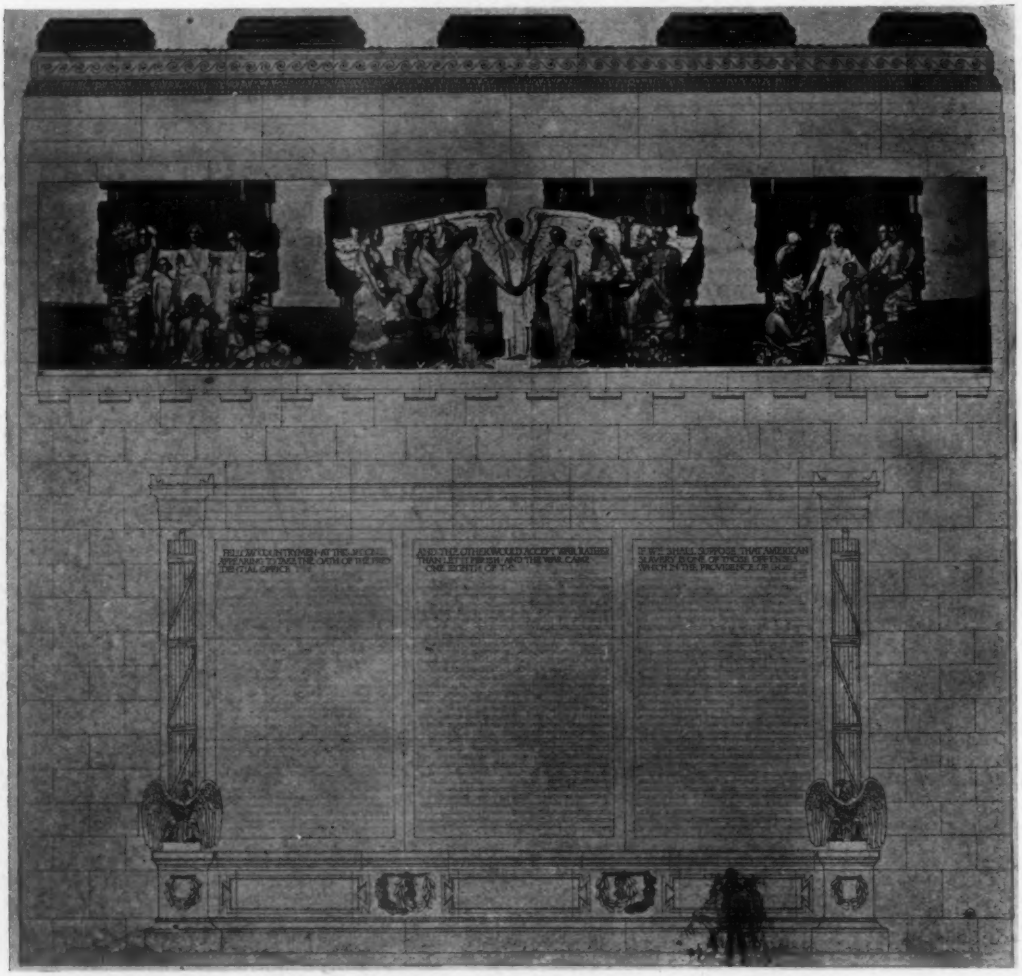
VIEW FROM ROAD TO ARLINGTON

Suggests Robert Mills' design for the Washington Monument.

ment of the Government, and to the west, over a mile distant from the Capitol, is the Monument to Washington, one of the founders of the Government. If the Lincoln Memorial is built on this same axis still farther to the west, by the shore of the Potomac, we will there have the monument of the man who saved the Government, thus completing an unparalleled composition which can not fail to impart to each of its monuments a value in addition to that which each standing alone would possess.

"An extension of the street car lines down Eighteenth Street and across B Street into the park, thence turning westward and running about 40 feet south of B Street to the Twenty-third Street entrance of the park, opposite the site of the Lincoln Memorial, will make the Potomac Park site readily accessible, as it should be, to all classes.

"The design submitted of the Lincoln Memorial is a development of the designs already submitted by me. The structure has been enlarged, the design of the approaches, terraces and steps has been revised and the front of the Memorial has been made more open. From the beginning of my study I believed that this Memorial of Abraham Lincoln should be composed of four features—a statue of the man, a memorial of his Gettysburg speech, a memorial of his second inaugural address and a symbol of the Union of the United States, which, he stated, it was his paramount object to save, and which he did save. Each feature should be related to the others by

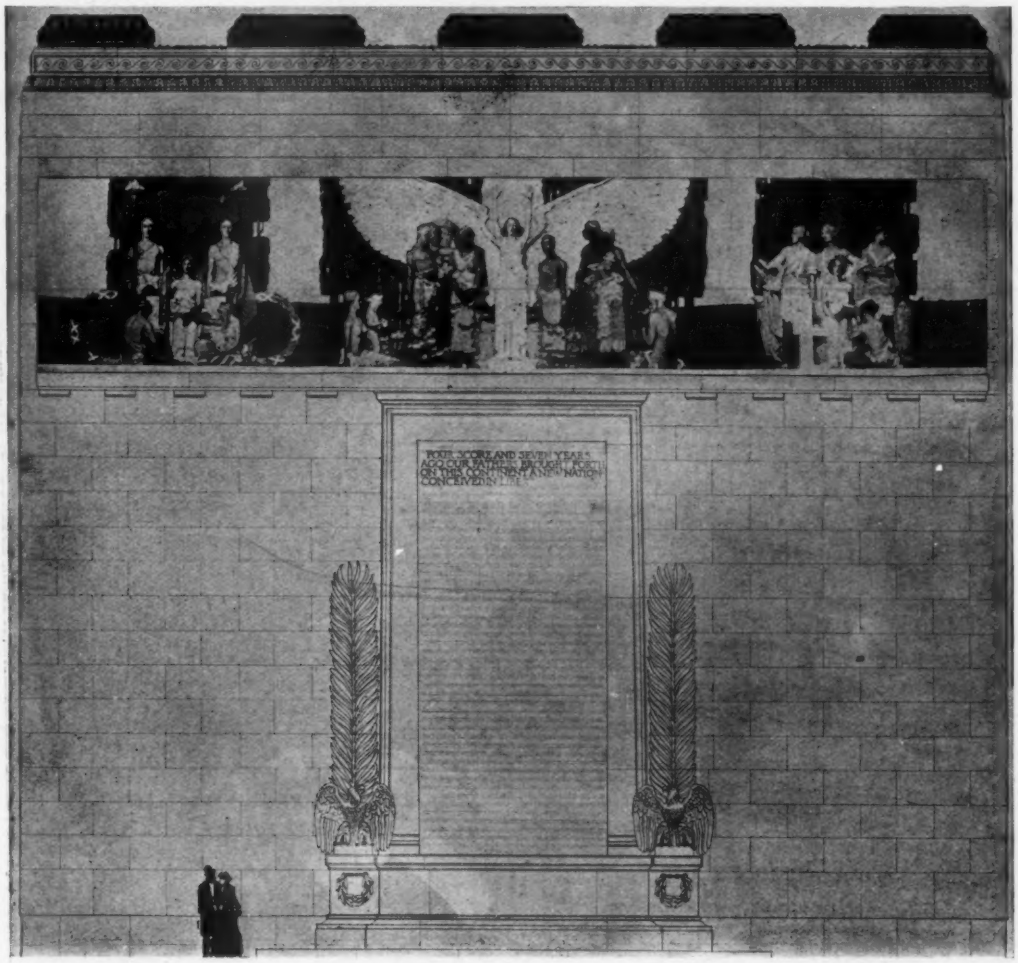


END OF HALL, WITH INSCRIPTION OF SECOND INAUGURAL ADDRESS
DECORATIONS BY JULES GUERIN

means of its design and position, and each should be so arranged that it becomes an integral part of the whole, in order to attain a unity and simplicity in the appearance of the monument. Each feature should impress the beholder with its greatest force, and by means of isolation this can be accomplished, though this isolation should not be planned to the extent of impairing the relation of each feature to the others.

"The most important object is the statue of Lincoln, which is placed in the center of the Memorial, and by virtue of its imposing position in the place of honor, the gentleness, power and intelligence of the man, expressed as far as possible by the sculptor's art, will predominate. This portion of the Memorial where the statue is placed would be unoccupied by any other object that would detract from its effectiveness, and the visitor will be alone with it.

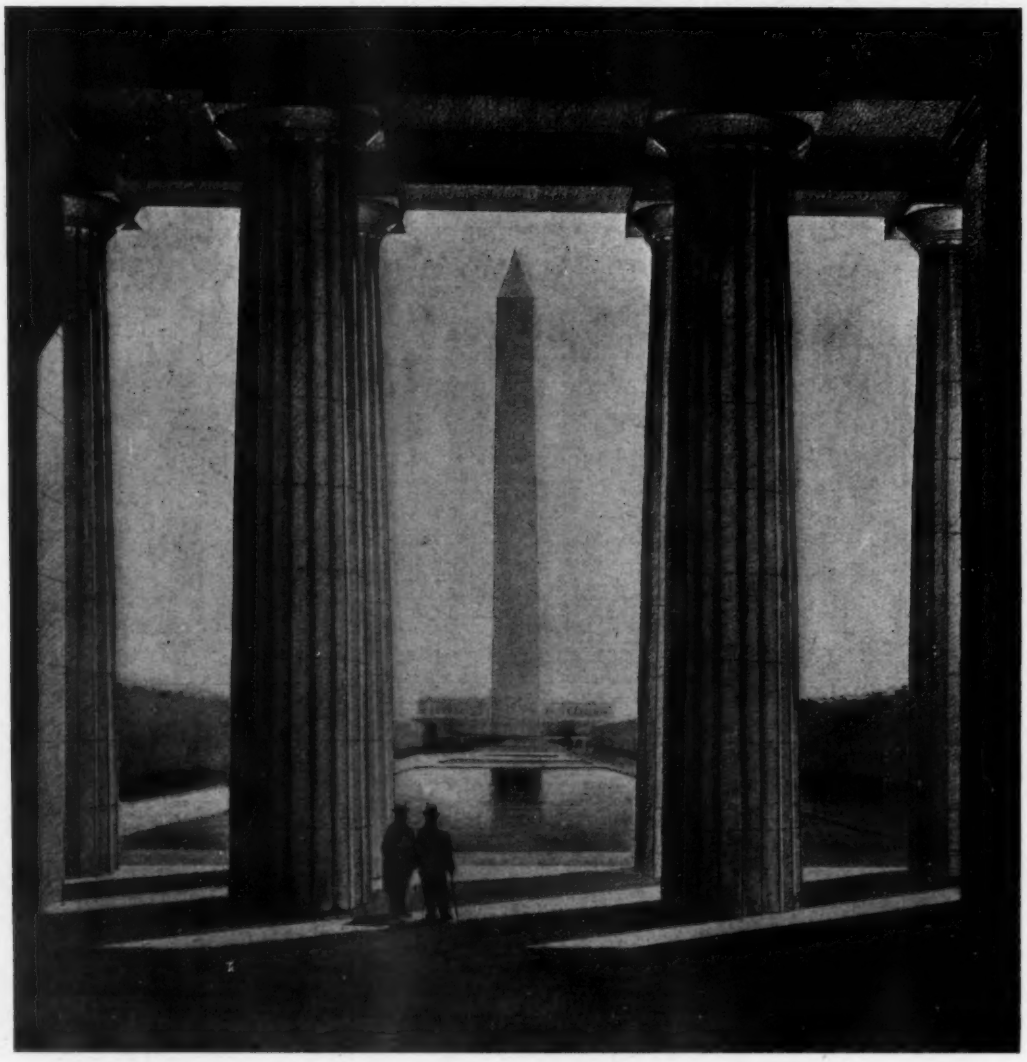
"The smaller halls at each side of the central space would each contain a memorial—one of the second inaugural and the other of the Gettysburg address. These speeches would be shown by bronze letters arranged on a monumental tablet, and adjacent low reliefs or decoration would relate in allegory Lincoln's great qualities evident in those speeches. While these memorials can be seen from any part of the hall, they are partially screened from the central portion where the statue is placed by means of a row of Ionic columns, giving a certain isolation to the space they occupy and augmenting thereby their importance. I believe these two great speeches made by Lincoln will always have a far greater



END OF HALL, WITH INSCRIPTION OF LINCOLN'S GETTYSBURG ADDRESS
DECORATIONS BY JULES GUERIN

meaning to the citizens of the United States and visitors from other countries than a portrayal of periods of events by means of decoration. I think, however, some reliefs and decoration designed in conjunction with these memorials and representing

of the man is planned a colonnade forming a symbol of the Union, each column representing a State—36 in all—for each State existing at the time of Lincoln's death, and on the walls appearing above the colonnade and supported at intervals by eagles, are



THE WASHINGTON MONUMENT AS SEEN LOOKING OVER THE LAGOON FROM CENTRAL HALL OF LINCOLN MEMORIAL

HENRY BACON, *ARCHITECT*

in allegory Lincoln's qualities, such as charity, patience, intelligence, patriotism, devotion to high ideals and humaneness, will emphasize the effect of the speeches.

"Surrounding the walls inclosing these memorials 48 memorial festoons, one for each State existing at the present time.

"I believe this symbol, representing the Union, surrounding the memorials of the man who saved the Union, will give to them a great significance that

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will strengthen in the hearts of beholders the feelings of reverence and honor for the memory of Abraham Lincoln.

TECHNICAL DESCRIPTION.

"By means of terraces the ground at the site of the Lincoln Memorial will be raised until the floor of the Memorial itself will be 45 feet higher than the present grade. First, a circular terrace 1,000 feet in diameter is raised 11 feet above the present grade, and on its outer edge will be planted four concentric rows of trees, leaving a plateau in the center 755 feet in diameter, which is greater than the length of the Capitol. In the center of this plateau, surrounded by a wide roadway and walks, will rise an eminence supporting a rectangular stone terrace wall 14 feet high, 256 feet long and 186 feet wide. On this rectangular terrace rises the marble Memorial. All the foundations of the steps, terraces and Memorial will be built on concrete piling which extends down to the solid rock.

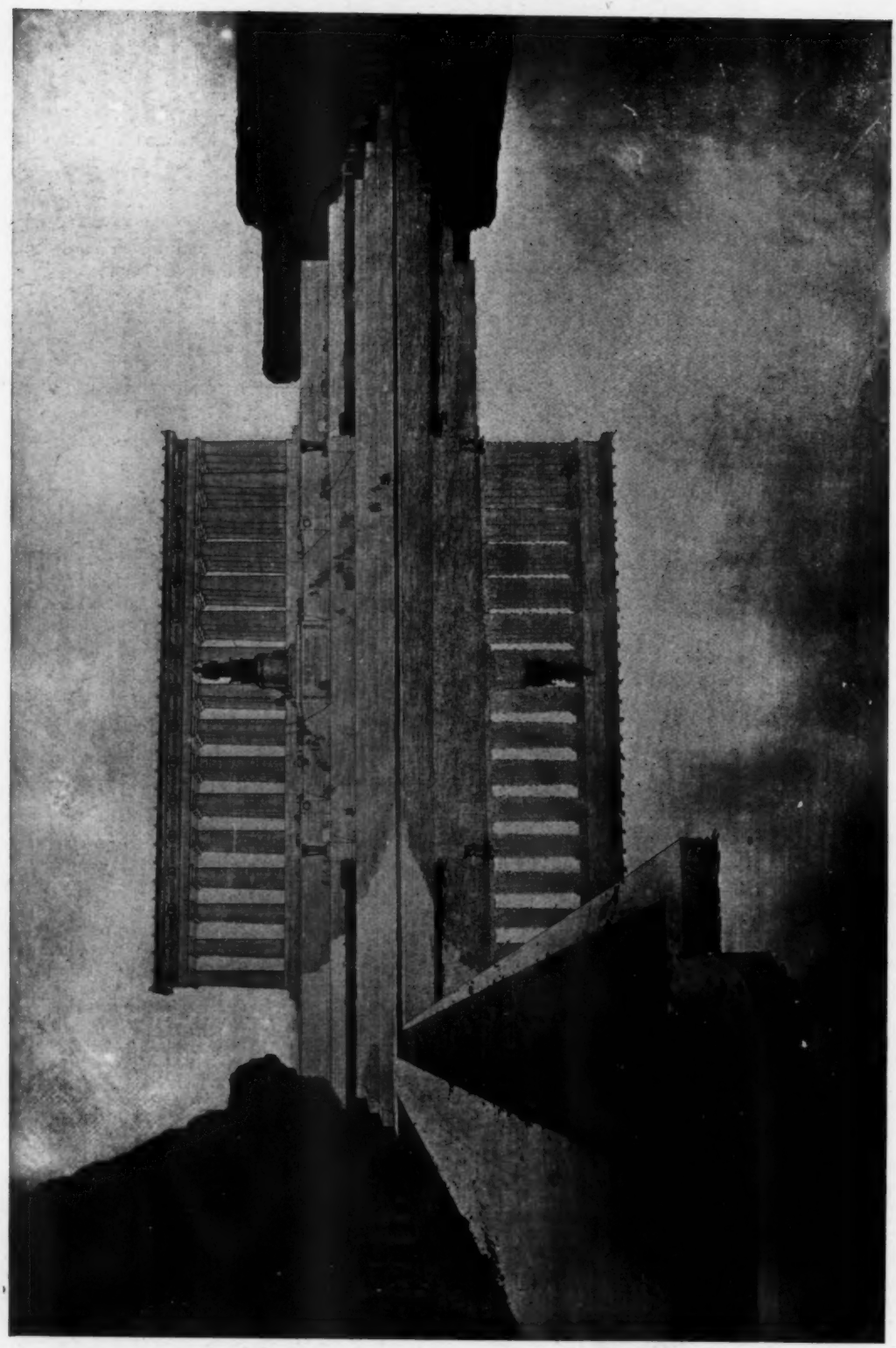
"Three steps 8 feet high form a platform under the columns. This platform at its base is 204 feet long and 134 feet wide.

FIRST INAUGURAL ALCOVE
THE LINCOLN MEMORIAL
HENRY BACON, *ARCHITECT*

"The colonnade is 188 feet long and 118 feet wide, the columns being 44 feet high and 7 feet 5 inches in diameter at their base.

"The total height of the structure above the finished grade at the base of the terrace is 99 feet. The finished grade at the base of the terrace being 23 feet above the present grade, the total height of

(Continued on page 537)



THE LINCOLN MEMORIAL, WASHINGTON, D. C.
DESIGN SUBMITTED FOR AN OPEN COLONNADE AS PREPARED BY
HENRY BACON, *ARCHITECT*

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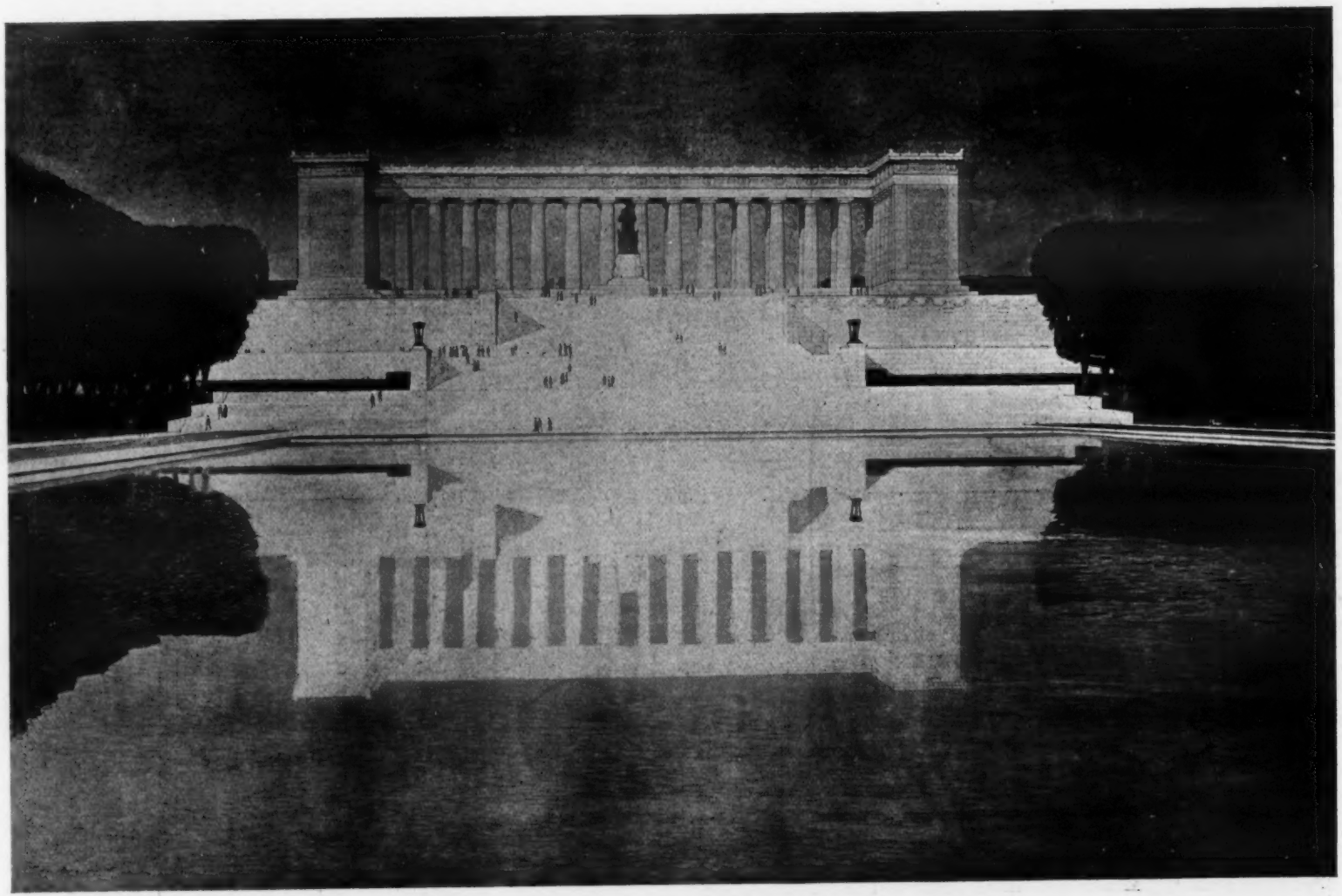

THE LINCOLN MEMORIAL, WASHINGTON, D. C.
DESIGN FOR AN OPEN COLONNADE WITH SOLID RETURNS
HENRY BACON, *ARCHITECT*

Dyckman Farm House, Broadway and 200th Street, New York

(See reproduction of the original drawing by O. R. Eggers in this issue)

THE New Yorker, whose boyhood recollections go back half a century, will recall that having ventured through those dark tree-embowered lanes which parallel the Hudson, or along the seldom frequented continuation of what we now call Broadway or the Boston Post Road, he came finally to the Dyckman Farm, whose rolling meadows reached down to the Hudson River.

There he found a low gambrel roofed farm house which even then showed all the weather marks of old age. There were Dyckmans living there then, and there they continued to live until about 1871, when the phenomenal progress of the city northward had surrounded the farm with a well developed suburban community.

The Dyckman house is a good example of the type of house that the early Dutch settler on Manhattan Island and across the Hudson in New Jersey so much affected. Long and low, these houses, correctly proportioned at the outset, received equally well considered additions as the needs of the increasing family demanded. In the present instance the "wing" of this house is of earlier date than the main building, which was built in 1783.

Owing to the generosity of Dyckman descendants, this old farm house has been restored as far as possible to its former condition, and with the ground about it presented to the City of New York as a historical museum and park.

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DYCKMAN HOUSE, NEW YORK

THE AMERICAN ARCHITECT Series of Early American Architecture

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EDITORIAL

Wrecking of Old Buildings

JUST now wreckers of old buildings are reaping a harvest. Old brick, second-hand lumber and all the salvage from old buildings are now eagerly sought and at offered prices that have made the dealers in second-hand materials extremely happy. If it is true that everything comes to him who waits, then those dealers who have kept stored in heterogeneous piles the vast accumulation of years are at last coming into their own. The Golden Dustman of Dickens had no more valuable store in his heaps of refuse, nor Quilp in his dingy yard by the river, than have those dealers who have stored away for years all that was left of many a one-time important structure.

There's always a certain romance in an old building when it comes under the wrecker's hands as there is a pathetic aspect to a one-time noble ship, when careened on its bilges on some muddy flat where it awaits demolition and the salvage of its copper and oaken planks. We tear down, alter or enlarge so much in this country that buildings seldom reach a ripe old age and are comparatively young when demolished. But in the widespread operations of converting one-time stately New York residences, built often in the '50s and '60s, into modern apartment buildings, there is much salvage that has not only an intrinsic value but also a considerable artistic importance. Collectors of such things are constantly alert, and wreckers have become keenly alive to the fact that many things that through ignorance they regarded as so much rubbish have been eagerly sought for and purchased at good prices. Particularly is this true in the Greenwich and Chelsea Village sections of New York. Fine old iron work, entire entrance doorways, and solid mahogany interior doors are examples. In some cases fine paneling has suddenly been transferred from these old houses to stately suburban places. Architects, always keenly alive to the possibilities that have attended such demolition, have been watchfully awaiting every opportunity.

BUT the value, to-day, of the purely structural material must not be overlooked. There is constant demand for brick and lumber, door frames, windows and window frames, and these are sold as fast as they can be taken out of the old buildings. A comparison of the value of certain of this second-hand material as compared with its salvage value twenty years ago is interesting. Times have changed and the fashions of architecture and decoration widely altered. Fine, hand-carved black and white marble mantels such as carried considerable pride of possession a quarter of a century ago are now of little value. Unless they possess some out of the ordinary artistic merit there is no sale for them, and even those which a collector may regard with a longing eye may be had for a most reasonable price.

Many are the lessons we have learned since the world was set topsy-turvy by the Great War, and perhaps the most valuable is that of economy and thrift. The man who recklessly cast aside things but partly worn and bought anew, now sets about effecting their rehabilitation. Less goes to waste now than over before, and the old house that at one time would have gone to the scrap heap and burned as refuse, now lives again in part in many an important building. "Thrift," said Theodore Roosevelt, "is judicious spending." The best expression of our newly developed ideas of thrift is shown by the careful conservation of many things that once, in a spirit of reckless extravagance, were discarded, and the judicious purchase of many a thing which in the days of comparative opulence we despised.

Fifteen to Thirty Per Cent.

JOHN SKELTON WILLIAMS, Comptroller of the Currency, in a statement given wide publicity by the daily press, asserted that unjustifiable interest rates have been charged on demand loans in New York. In order that the public might be fully informed and know the exact facts in regard to the money situation in New York, the national banks in New York City were requested by the Comptroller of the Currency to furnish, under oath, a report of the number and amount of all demand loans made during a certain period. These sworn reports disclose that during the period from October 1, 1919, to August 1, 1920, there were made by the national banks in New York City more than four thousand

loans at rates of 15 per cent., 20 per cent., 25 per cent. and 30 per cent. per annum, and that the amount of these loans, including only a portion of those made during this period at the above rates in three of the largest banks, aggregated $600,000,000.

Mr. Williams also pointed out in his statement that the banks which had been charging their customers these excessive rates have themselves at the same time been liberally accommodated with millions of dollars by the Federal Reserve Bank at average rates of considerably less than 6 per cent.

With such conditions as these, the truth of which cannot be questioned, is it not pertinent to inquire what chance will a man have who wants to build him a house and expects to get the money at a legal 6 per cent. rate? In spite of high prices of material and labor, in spite of all the irregularities of railroad transportation, and in spite of all these adverse conditions that surround the housing situation today, the American man is acknowledgedly a good sport and would take a chance on his house if the banks would let him have the money to build it with. With money selling, as Mr. Williams shows, from 15 to 30 per cent. the contention that has been made in these columns and on the part of others quoted therein, that the real retardance to housing was due more to the attitude of capital than to any other factor, would seem to be justified.

Misapplied Maxims

THE voice of the theorist is heard in the land. Under the subdued light of "study" tables there are penned and sent forth ponderous views on every vital question. For example, during the past months, when the housing shortage has been so acute that sober-minded, rational people have been at their wits' ends in the matter, forth come these studious gentlemen with some space-filling thesis whose clear cut use of English, whose polished style is in directly opposite proportion to the practicality of their schemes.

Metaphors are their delight, old folk lore sayings their stock in trade. They smugly tell the world that "it's an ill wind that blows no good," and then continue by a fine argument set forth in correct English to prove to the man who is vainly seeking a shelter for himself and family that there are really some fine compensations in the present conditions and that the poor wretch should be glad that he is alive. "How often does the current of intelligence get itself clogged by a metaphor and there it stick," says a writer in *The New Republic*, "and," he continues, "a conspicuous obstruction at the moment is that half a loaf is better than no bread."

"Now, half a loaf *is* better than no bread at all. But the cool assumption that half of anything at all is better than none of it is one of the curiosities of the human reason. For, while there is a good deal to be said for half a loaf, there is little to be said for half of an automobile, half of a railroad engine, half of a bridge, half of a steel girder, half of a safe deposit vault, half of a glass jar, half of a pair of trousers, half of a deck of cards, or, as King Solomon demonstrated, half of a baby. When the thing you are talking about depends for its usefulness on structure and organization, the metaphor about half being better than none seems not to be of universal scope. For these cases proverbial wisdom provides another metaphor: it says that a miss is as good as a mile."

"A little learning is a dangerous thing" but not more so than too much learning illogically set forth to account for present conditions.

THE CRYSTAL PALACE FOUNTAINS, LONDON

The Lincoln Memorial

(*Continued from page 531*)

the building above the present grade is 122 feet.

"The outside of the Memorial Hall is 84 feet wide and 156 feet long.

"The colonnaded entrance to the Memorial Hall, which is 45 feet wide and 44 feet high, is equipped with sliding bronze grilles, filled with plate glass. These grilles during the day will be rolled back into the space provided in the walls, and will be closed at night for the protection of the Memorial. As they are mostly glass, they can also be kept closed during the day in cold weather without obstructing the entrance of light through the entrance, and a temporary bronze and glass vestibule can be provided in the lower portion of the grilles, which are subdivided at the bottom for this purpose.

"The central hall, where the statue stands, is 60 feet wide, 70 feet long and 60 feet high.

"The halls where the memorials of the speeches are placed are 37 feet wide, 57 feet long and 60 feet high.

"The interior columns are of the Ionic order and are 50 feet high.

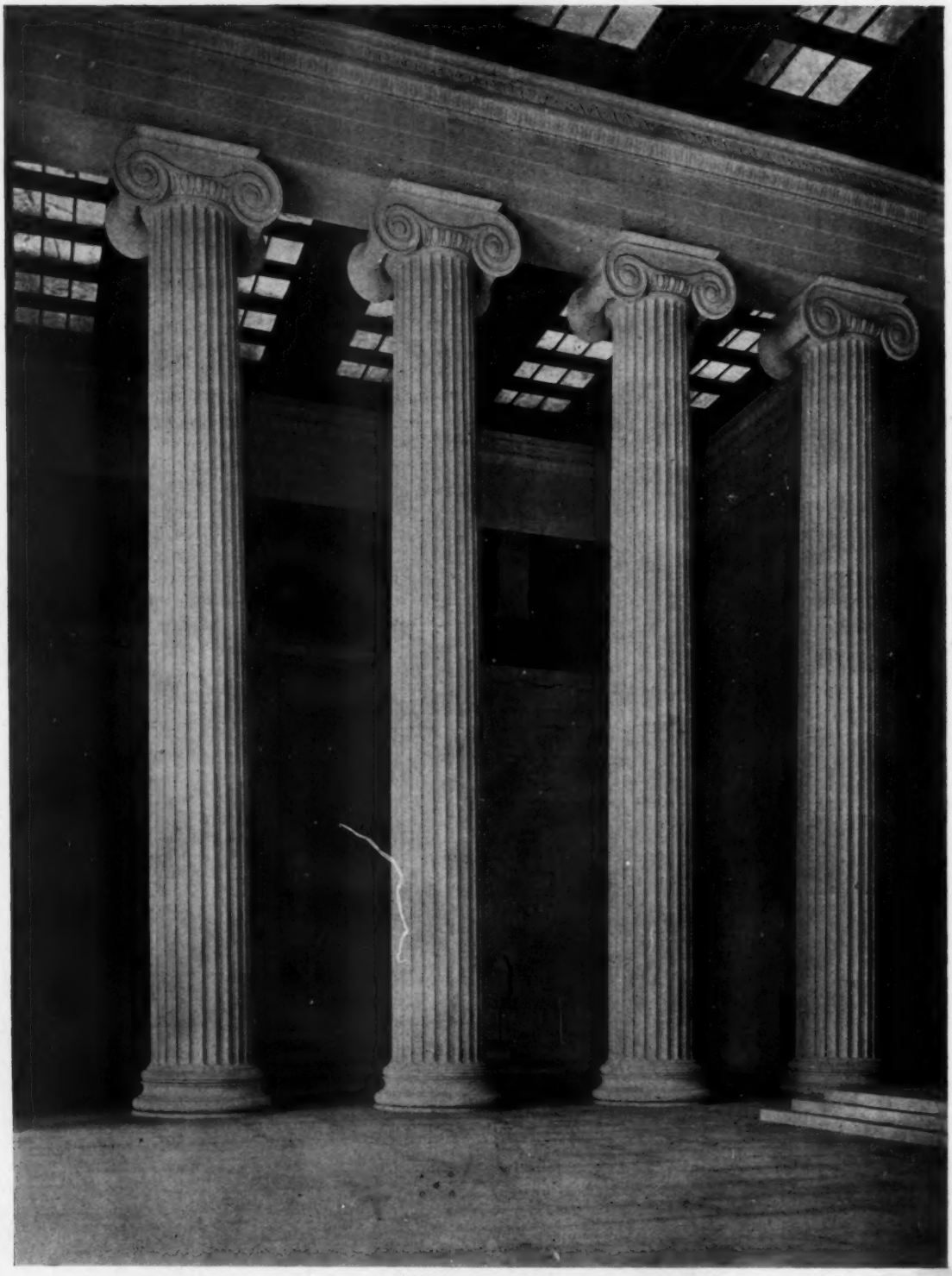
"The cost of erecting this Memorial, according to estimates received from a contractor of the highest standing in monumental work, the quantities being carefully computed, is $1,775,000. This estimate does not include the steps at the head of the Lagoon, the statue of Lincoln, the memorials of his two speeches, or the architect's commission. With the exception of the steps at the head of the Lagoon, which are properly a part of the landscape gardening around the Memorial, the design I have submitted, including the statue, the memorials and the architect's commission, can be built for the sum authorized by Congress."

This design fits into the landscape composition, in its classic lines; it typifies the culture to which Lincoln attained. The simple dignity of the Doric best represents his straightforward life and the dignity his services to the country justified. Its isolation, unhampered by other structures, surrounded by a landscape accentuating its prominence, illustrates the eminent and isolated position Lincoln occupies in our history. The interior is lighted through translucent marble panels. In the central hall Daniel C. French has sculptured a colossal seated statue of Lincoln. The propriety of Lincoln in the clothes of his period, fitting into the classical period of the architecture has been questioned. The suggestion was made by Paul Wayland Bartlett for an altar on which a bust of Lincoln should be the focal point of interest as requiring no time fixing clothes. This, supported by ideal figures of say patience and patriotism, would fit into the architectural scheme possibly better than the figure in modern clothes. Such sculpture would have been just as effective in commemorating Lincoln as it would have appealed to the imagination of the observer rather than to his craving for realism.

Jules Guerin's decorations in the north and south halls are effective in giving necessary color to the interior and emphasizing the tablets on which are inscribed the speeches and typify the qualities of Lincoln's character.

Congress this year appropriated the money for the water basin between the Washington Monument and the Lincoln Memorial which is destined and necessary in the completion of the landscape compo-

MOST PROMINENT VIEW FROM THE LINCOLN MEMORIAL, SHOWING THE UNFORTUNATE LOCATION OF THE WAR WORK BUILDINGS AND THE DESTRUCTION OF THE ELMS, WHICH CONSTITUTE SO IMPORTANT A FEATURE OF THE COMPOSITION OF THE LANDSCAPE



ALCOVE FROM CENTRAL HALL
THE LINCOLN MEMORIAL, WASHINGTON, D. C.
HENRY BACON, *ARCHITECT*

sition, and in giving the Memorial its most dignified effect. When the planting and grading are complete there is only one thing that will be an eyesore and mar the effect of the design. That one thing is the Army and Navy concrete building, whose numerous gridiron prongs project out into the park far beyond the building line fixed by the Senate some years ago, obliterating trees very important in the design. It is crude and ugly in itself and on the park and affects unpleasantly the repose and beauty of the Memorial.

Let us hope that the friends of beauty and those who revere the name Lincoln will take steps to have these marring elements removed. (The end.)

Tree Planting for Beautification

Plans for a state-wide tree planting survey, to be undertaken in the near future for the beautification of the California road system, were announced in Sacramento by George C. Mansfield, a member of the State Highway Commission. The State Board of Forestry is to be asked to assist in the work.

Mr. Mansfield said the object of the survey is to eliminate the haphazard, hit-and-miss methods now employed in tree planting, and to place the Commission in possession of the data needed to enable the Commission to act wisely and intelligently upon applications in the future. He said it is planned to begin the survey just as soon as funds are available.

"The Purpose of the proposed survey," declared Mr. Mansfield, "is not to work out a uniform scheme of tree planting, which would be impracticable and quite undesirable in a State as large as California, but to secure the technical knowledge needed in the adoption of a comprehensive plan of beautification.

"While one species of tree might be well suited for the needs of a certain locality, it is possible that it would be entirely out of place in another. That is the principal object of the survey—to find out the different varieties of shade and ornamental trees best adapted to climatic and soil conditions in various localities.

"Not only trees will be studied, but it is the plan of the commission to look into the desirability of planting shrubs in certain localities."

With such a fund of information, the Commission then will be in a position to advise civic bodies or other organizations seeking permits, the variety or varieties of trees which will be acceptable to the Commission.

Tree and soil experts will be entrusted with carrying out the main part of the survey, although the employment of landscape artists in some communities, it was indicated, is not an impossibility.

Along certain sections of the highway, he pointed out, it may be desirable to plant a variety of tree that grows tall to hide some blemish in the landscape, while on the other hand, scenic beauties may be best brought out by low-growing shrubs or by leaving the highway frames in the natural scenery of the country.

It also is the aim of Mr. Mansfield to have most of the trees needed for carrying out the scheme of beautification propagated at the proposed State nursery, a project for which provision was made by the Legislature several years ago, but which has been hanging fire due to the inadequacy of the appropriation and difficulty experienced by the Board of Forestry locating a suitable tract of land.

Solution for the Rural Problem

The great, almost startling exodus from the country to the city of young people, and many who are not young, is shown by the census figures recently published—the facts showing that during the past ten years the cities grew seven and one-half times as fast as country districts. What is the reason of this? Young men are not leaving the farms only to enjoy libraries, lecture courses or museums, or even for the sake of pleasure. The greatest lure of the city has been due to the high wages and superior conveniences.

The Albany *Knickerbocker Press* has stated a possible solution of this rural problem when it says:

"There is a remedy, however. It was suggested by Judge Howard, of Troy, several years ago; it is in operation in Australia and in California; it has just been proposed again, in substance, by Asher Hobson, professor of economic agriculture in Columbia University. It is to provide funds or credit with which any family which desires to take up farming may establish itself in some well developed and convenient farm area. This is getting down to first principles. It takes several thousand dollars to buy any sort of a farm worth having; to stock and equip it will cost, at the lowest, a thousand or two additional. Among the surplus population of the cities there are hundreds of thousands of worthy, industrious people who would welcome the chance to turn to farming if they had the means to get started. They are natural farmers, if they could only get on the land. But they can scarcely raise the next month's rent.

"Here is the state's opportunity. The expenditure by the state of a small fraction of the hundreds of millions it has spent on waterways and highways would subtract many thousands of families from the ranks of the consumers and turn them into producers. They would fill up the unoccupied homesteads; they would bring new life into the countryside; they would help solve the rural labor problem; they would have their own homes, cut their own fuel, raise their own milk, butter, eggs and meat, and they would add hugely to the surplus from which city consumers must live. By adding to this measure appropriate legislation fostering the interests of the small farmer, New York colud settle its rural problem within five years."

XUM

The Reconstruction of Northern France

The Fate of the Village Churches

By RALPH FANNING

MORE to be lamented from an architectural standpoint than the homes, as picturesque and charming as they so often were, was the destruction of the churches of Northern France. More reverenced and adorned than any other edifice of a village, they naturally occupied a most prominent and conspicuous site. Landmarks in the landscape, their towers rising above the low-roofed cottages, they were the first objects to attract the attention of friendly advance or enemy assault. Evidence has been given from both sides that these towers were used for signal places and so, from a military standpoint, had to be destroyed. Instances are known where machine guns were advantageously placed in churches, and, with the modern technique of war, if one sanctions it at all, one cannot consistently appear to be too greatly shocked by the destruction of churches. Long range cannon fire and bombs dropped from swift aeroplanes are not religiously discriminating.

SOUTH AISLE OF CHURCH AT DUN-SUR-MEAUSE

Fortified by a cold philosophy and attempted suppression of sentiment, it is yet difficult to pass by these slaughtered churches without a feeling of horror as for wanton desecration and barbaric assault. Even a non-conformist to churchly traditions, untrained by generations of reverence to symbolism,

THE CHURCH AT CLERMONT EN ARGONNE

cannot help but be shocked by the heedless fall of the image of some smiling saint, a wrecked crucifix, or the vulgar misuse of a consecrated altar. The world has shuddered over the mutilation of the cathedral of Rheims or the ruin of Soissons, and much has been told of the sad fate of the many more famous sanctuaries; but of the little village churches, modest and unrenowned, much, quite as touching, could be related. Statistics show that over eight hundred village churches in the departments of the Nord, Somme, Ainse, Ardennes, Meuse and Marne have been destroyed beyond repair. This does not include the cathedrals and great town churches, but the church of the rural parish, where the country people for many generations had gathered for prayer and worship.

Gone with the churches are many a quaint architectural feature, the results of centuries of builders' skill and love inspired handiwork, for one's best was ever given to the church as beautiful evidence of Catholic faith and piety. The silhouette of a belfry tower, its oddly arched openings, the niche for a painted saint, unique mouldings varying between the Gothic and neo-Classic, the stone tracery and gaudy glass, crude art in painted canvas or ecclesiastical objects; all these are too often now but powdered fragments or dingy debris. Gone are

BRIZEAU, UNDESTROYED, BUT MARRED BY THE PASSING OF MANY ARMIES

many of the homely objects, homely only in the sense of being familiar and intimate, altars, confessionals, pulpits and founts, modeled after some more famous prototype in the nearest cathedral, but village-made and bearing the tool marks of painstaking village handicraft. Gone, too, are the records of birth, baptism, marriage and death, that these churches had guarded for so many generations.

NEUVILLY-MEUSE. THE CHURCH BEYOND REPAIR

From some village churches in the stricken areas the Angelus still sounds, calling to the laborer as he toils at the discouraging tasks of reconstruction, but it must ring as a sad reminder, as to toll for happier days and for sons and friends who will never again join them in the simple services led by the old priest. Monsieur, le Curé, who has made such a heroic record during the war years, proving himself a real father to his village family with untold courage and devotion, also must strive to keep in hiding the sad recollections. He sees his church, if not already in ruin, falling into decay, his flock scattered and lost during their banishment, and he feels the difficulty of reestablishing the former influence of the Church over Her people. One hears rumors of the lost power of the church over the people, who have had forced upon them a broader viewpoint than their old village life ever afforded, and who have come back to see their trusted sanctuaries in defilement. More often, however, among the first rumors that reach one, is of the requests of a returning populace for the materials to repair the church or for a barrack in which to continue

AT DOMBASLE THE CHURCH TOWER STILL STANDS ABOVE THE FALLEN VILLAGE, THOUGH ITS WALLS ARE UNSAFE

worship if the church were too badly damaged even for partial repair.

In many cases any sort of architecturally authentic restoration of the village churches is going to be impractical. Disintegration follows very rapidly once some shell holes and broken windows have allowed the frequent rains and rapid growing vegetation to enter unrestrained. Century-old vaulting is hard to repair once its vital voussoirs become loosened or displaced. Tottering or unstable walls are often a greater hindrance than help in the remaking of a ruined church. As appealing as is the call to save the crumbling church structures before further decay completely obliterates its form, little time or materials can be spent upon places of worship while hospitals need to be restored and women

XUM

and children are without proper shelter. Oftentimes the new village will be erected on a new site, so great will be the difficulty of clearing and reclaiming the old. In such cases the old church site, with its sacred ground, will probably have to be abandoned for a more convenient location. Thus even if the new and more costly edifices could be built to replace the old religious houses, nothing can replace the old structures with their associations, their atmosphere, their very being which is so intimately a part of the vigorous France of the North, the France that has suffered as none other.

Book Notes

Blue Print Reading, Interpreting Working Drawings, by E. M. Wyatt. Full cloth, 85 pp. text and working drawings, 9 x 6 inches. Milwaukee, The Bruce Publishing Co.

THIS book is practically a course in blue print reading and the making of mechanical and architectural drawings. It has been prepared by a man who has taught these subjects to classes and used the material contained in the book for his text. The course has been prepared, as the author asserts in his introduction, to provide a working knowledge of the fundamental or underlying principles of mechanical drawing, a knowledge of drafting conventions, practice in the interpretation of drawings and some practice in expressing individual ideas by "shop sketches."

The volume consists of a series of chapters or "lessons," each accompanied by one or more well drawn plates of working drawings illustrating the matters dealt with in the text. Appended to each chapter is a series of questions for the purpose of supplementing a thorough study of the drawings.

The illustrations consist of both machine and architectural drawings, ranging from simple sketches, showing various methods of representation to drawings of a completed machine and of house plans.

Included in the "lessons" are such topics as The Theory of Orthographic Projection; Foreshortened Lines, Inclined Surfaces, Auxiliary Projections; Bolts, Screw Threads, Machining or Finish; Architectural Conventions, and others of equal importance to those interested in the subject of reading and understanding of mechanical and architectural drawings.

Personnel Administration, Its Principles and Practices. By Ordway Tead and Henry C. Metcalf, Ph.D. Full cloth, 540 pages, 6½ x 8 inches, New York, McGraw-Hill Book Company, Inc.

THE purpose of this book is to set forth the principles and the best prevailing practice in the field of administration of human relations in industry. This field includes all those efforts usually included in personnel management; employment, health and safety, training, personnel research, service features and joint relations. The book is addressed to employers, personnel executives and employment managers, and to students of personnel administration. The subject is of vital importance to the architect, just as is any topic dealing with industrial relations. The authors' aim is to make this volume a helpful manual and they tend to create the proper point of view rather than to indicate specific next steps.

The book is divided into nine chapters and an appendix, each dealing with a different phase of the subject. After the first introductory chapter the personnel department and methods of employment are taken up. The subjects of health and safety, and education are next discussed with considerable detail. Industrial research and the very important matter of the correlation and co-operation of the executive departments and the various shop departments of the plant are considered in two well-written chapters. Joint relations, dealing with such topics as shop committees, employees' associations, collective bargaining and other similar topics is considered in the last chapter which is followed by the appendix containing a topical outline for the use of students in visiting plants.

This volume should prove of considerable value to those interested in the subject of industrial relations and particularly with employment and personnel management.

Hellenic Architecture, Its Genisis and Growth. By Edward Bell, M.A., F.S.A. Full cloth, 185 pp., 5 x 7½ inches, London, G. Bell & Sons, Ltd.

THIS book is one of a series dealing with the origins of architecture. It may suggest that it is somewhat uncalled for in view of the number of standard works that already deal exhaustively with the subject of Greek architecture. The archeological discoveries and disclosures of the past few years, the result of research expeditions undertaken since the publication of these standard books, give ample material for further literature dealing with the sources of Hellenic art. The author,

XUM

through careful original research and with the aid of data gathered by various archeological bodies which have conducted expeditions, has prepared a volume of unusual interest on a topic, the discussions of which supplement many extant works that deal with the subject.

The origins of Greek architecture are painstakingly traced from the prehistoric era, through the early periods of the Mycenean and Doric builders, to its culmination in the Ionic and Corinthian styles. The thirteen chapters treat in detail the various influences which were at work in developing the Grecian style to its perfection.

The book is illustrated with numerous plans and photographs of buildings, existing and restored, and a map of the ancient Eastern Mediterranean area.

Spanish Seaport a Colorful Old City

LEAVE Fuenterrabia for San Sebastian and you will pass within less than one hour from the Spain of other days—proud, indolent, and down at heel—into the energetic, opulent and business-like Spain of today, a writer in the London *Times* reports.

I had not seen her for ten years or so. What a change! In those days you plunged straight into wild country—uncultivated fens, bumpy roads, furrowed deep with ruts, wretched hovels, passengers afoot clothed in dust-ridden rags. Today the train runs between rows of gleaming fields, where the young crops rise thick and sturdy. Motor cars, numberless as in France, glide along the greyish-blue high roads that are smooth like ice. Everywhere are factories with reeking chimneys; villages, roofed with new tiles, cast their crude-tinted girdle about belfries harmoniously tempered by sun and air. The peasants in Basque bonnets and well cut suits, exude health and ease. But the pang at my heart is not all regret for the vanished picturesque; happy are the people whom the war has left untouched.

At San Sebastion the impression of opulence grows stronger; the streets, ruled straight and cutting each other at right angles in the American fashion, are broad, airy and admirably kept; the houses—shrines somewhat perhaps too lavish of the deplorable art moderne imported direct from Munich—look solid and respectable beneath the stucco proportions and gilded vermicelli with which they are tricked out. Squares and spaces open out everywhere, and their brilliant, bushy gardens frame themselves about statues that are quite devoid of genius, but copiously bespread with marble and gold. All this, to be sure, is not beautiful, in the purely esthetic sense, but it is rich, and the whole town throbs with the vigorous, buoyant and daring impulse of youth.

On the Paseo, fringed with tamarisk, which runs all along the shore, the Casino squares itself proudly; its theatre and gaming tables remain open all the year. People come from long distances in France and Spain in order to play here, and the sums won, or more often lost, mount up to considerable figures.

Although it is only 11 o'clock in the morning on a bandstand soldiers in bright red caps and trousers are playing dance airs that seem punctuated with the cheerful clatter of castanets. A laughing, chattering, many-colored crowd surges all around—workmen in butcher-blue; diminutive warriors, completely lost in uniforms too ample, but predominantly scarlet; pale green gendarmes in canary-yellow strappings, with shiny eyes under a leather cocked hat. Their pealing merriment drowns at times the sonorous brasses of the band.

But there is something odd about this crowd; what can it be? Ah—now I have it! The crowd is a crowd of men—(in Spain women do not go out at all of a morning)—in the full strength of their manhood. In France and in England, alas! this is something that we know of no more.

Immediately behind the Casino you stumble all of a sudden upon the old harbor, tucked away at one of the far ends of the bay, under the lee of lofty dilapidated houses gaily festooned with multi-colored raiment drying on pointed wooden balconies. Along the quays fisherman unfurl their vast brown nets; workmen are unloading coal; and fisher-girl trips lightly on bare feet, with a roll of the hips, and looking like caryatids as they grasp the round baskets poised upon heads nobly erect. And slender boats, with wings red or white folded back along the masts, slumber amicably shoulder to shoulder, on the dead-level of the water, in a powerful stench of sardines, brine and tar.

Here starts the winding path that beneath the kindly shade of the beeches climbs to the summit of one of the two scraped rocks which, crowned with the imposing mass of their ramparted red bastioned forts, stand sentinel on either side of the extended bay.

No line could be purer than the rounded, perfect curve of this Bay of San Sebastian, so happily named La Concha, whose luminous blue waters seem encased in a threefold circle—a circle of sand, polished in grain, and with a glint of gold; a circle of houses and hotels, gleaming softly in the distant sunshine like marble palaces; and a circle of mountains whose severe outline is mitigated by a light mist. In the distance the sparkling, empty sea meets the boundless sky. A prospect of harmonious, restful majesty which man has been powerless to disturb.

The races at San Sebastian are not run in an environment so grandiose, but a few miles outside the town, in an agreeable hilgirrt arena which spring adorns with delicate tints. No crowd, but a good humored public equally ready to cheer the horses,

with their fine drawn shapes; or the British jockeys; or the reines des marches of Paris and Metz, who figured in the after-war Mi-Careme festival in Paris, young swallow harbingers of peace, whose first return San Sebastian has desired to celebrate.

Arrayed in democratic "tailor-made" costumes, pink and smiling under their light hats, the little majesties pluck daisies in the grass, seemingly more sensitive to the charm of spring than to that of the races and of the betting. For spring, indeed, is the winner of the day. Between the events the patrons of the Pelouse—young women, modish but hatless, their heads geared only with their hair built up into a cunning tower from which here and there a kissing curl escapes; young men in cap or soft hat, with a rose in their button hole—just stretch themselves upon the velvety-soft grass, and, with their arms beneath their heads and with a violet twixt their teeth, they contemplate the purple sky through half closed lids . . .

A group of men in tight blue jerseys and in the soft shoes of the country are conspicuous by their boisterous gaiety. They are French fishermen. The Bidassoa's neutral stream belongs by local usage for alternate twenty-four hours now to the Spanish fishermen, now to the French fishermen. At this season the river is full of salmon, and these Frenchmen have taken seventeen fish, each weighing some sixteen to twenty pounds.

"We came to San Sebastian to sell them," they cheerfully explained. "At 3.50 pesetas a pound, prices are lower than in France; but reckoning the exchange this will make a tidy sum; near on 2,000 francs!"

"Well, it's an ill wind," they say . . .

"But," as somebody remarked, "the Spaniards will eat the salmon!"

Standardized Lumber Sizes

The need of standard sizes for all the different lumber products has been felt for some time, due to the exceedingly numerous and constantly changing sizes, and the action of prominent lumbermen in promoting standardization presages another progressive step in the lumber industry. The United States Forest Products Industrial Research Laboratory at Madison, Wis., has been co-operating during the past year with the National Lumber Manufacturers' Association in working out an equitable basis for standardizing softwood lumber sizes. Some of the benefits to be derived from standardization follow:

1. It makes possible a common language for all. The consumer can substitute one species for another with assurance of getting material of the same size. Similarly, if a contractor starts to build several house and orders his millwork, sash, doors, etc., based on certain lumber sizes as to stock around which the casing fits, the kind of wood can be varied as he desires.

2. Architects and purchasers can order more rapidly with one set of sizes—looking for sizes scattered throughout different grading rule books is eliminated.

3. Material of standard sizes is more salable and by increasing the consumer's good-will creates and adds value to the products.

4. Building design is simplified, since fewer sizes can be used.

5. Uniformity in construction results, regardless of the grading rules under which the material is purchased. Manufacturers now cannot standardize millwork, etc., because it is dependent upon the sizes of the lumber used in building.

6. Remanufacture of larger sizes to match smaller sizes will be reduced and greater utilization with less labor and expense result. The architect frequently designs a building in accordance with the minimum sizes of lumber which may be furnished rather than on a species that can be procured in larger sizes.

7. Standardization of sizes eliminates local legislation on lumber sizes which confuse manufacture and distribution. Such legislation has already been suggested.

8. Standardization makes for fewer sizes and hence greater efficiency, ease and accuracy in lumber grading.

9. It equalizes competition between manufacturers, because present differences in overrun and freight charges are important factors in determining price.

10. It makes possible uniform practice and sizes in resawing.

11. It makes possible a fewer number of drying schedules in the kiln drying of lumber. At present the actual thicknesses of lumber of the same and different kinds cut under the rules of different associations often varies several per cent.

DEPARTMENT · OF · ARCHITECTURAL · ENGINEERING

FACTORY OF PHILADELPHIA TEXTILE MACHINERY COMPANY, PHILADELPHIA, PA.
Wall radiators used effectively along skylights

Heating and Ventilating Industrial Buildings Part—I

By CHARLES L. HUBBARD, *Heating Engineer*

THERE are three general methods of heating industrial buildings, these being classed under "direct steam," "direct hot water" and "hot blast." Each of these systems has two or more sub-divisions, and various combinations may often be used to advantage in special cases. The requirements of industrial buildings vary widely, depending upon the character of the goods manufactured and the special processes carried on in different departments. Certain buildings, like woodworking and machine shops, having a large cubic content per occupant, require very little, if any, outside air supply, other than that furnished by natural leakage, and may be heated in a per-

fectly satisfactory manner by direct radiation, which may be supplied either with steam or hot water. In shoe shops, textile mills, etc., where the space is more crowded, and where the air contains more or less dust, lint, odors, etc., fresh air is needed in greater quantities and the hot blast system in some form is necessary. If these conditions exist only in certain rooms or departments, direct heating, combined with exhaust ventilation, may often be used to advantage. While forge shops and foundries may be satisfactorily warmed by direct radiation, the excessive amount of smoke and vapor makes it necessary to employ some special means of ventilation, and it is usually best to combine this with the heating in the form of a hot blast system.

In laundries, dye-houses, etc., the removal of

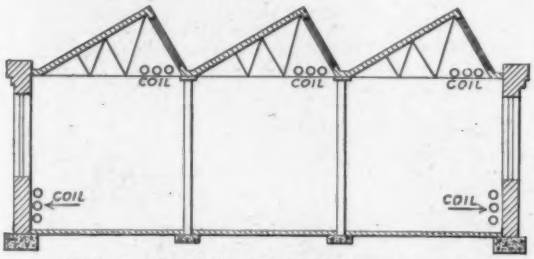


FIG. 3. OVERHEAD HEATING COILS

water vapor is an important factor, and this should be studied in connection with the problem of heating, as will be shown later. The modern factory building differs from the older type in its greater proportion of glass surface and the thinner wall construction, which is usually of steel and concrete, with a brick facing in some cases.

While the greater proportion of glass exposure adds to the heat loss by transmission, the general use of metal sash reduces the loss by leakage, due to the greater tightness of construction.

But this, however, reduces the natural ventilation and makes it all the more necessary to provide artificial means for the outward passage of the exhausted or overheated air. With the older type of construction, having wooden sash and other means of leakage, it was usually sufficient simply to supply fresh air and let it leak out as best it might under the slight pressure produced by the fan. With concrete walls and iron sash the same general fan arrangement may be used, but special means must be provided for exhausting the air.

Heat Loss.

In giving data for the heat loss from industrial buildings, two types of construction will be considered, designated as Class A and Class B.

Class A. Buildings of this type are usually constructed with walls of solid brick or concrete, without insulating finish or any kind on the inside walls, except in special rooms, such as offices, drafting rooms, etc.

The figures in the last column of Table I give the heat loss by transmission in thermal units per square foot of outside wall and roof surfaces per hour for an inside temperature of 70 degrees when it is zero outside.

TABLE I—HEAT LOSSES IN B.T.U. PER SQ. FT. OF SURFACE PER HOUR.

For Inside Temperature 70 deg. F. Outside Temperature Zero.*

	Construction	Heat Lo ss
WALL	Brick 4 in. thick	38
	" 8 in. "	28
	" 12 in. "	22
	" 16 in. "	18
	Concrete 4 in. thick	50
	" 8 in. "	37
	" 12 in. "	30
	" 16 in. "	24
ROOF	Slate on matched boards	21
	Iron on matched boards	12
	8-in. hollow tile, 1-in. concrete, tar and gravel	28
	6-in. concrete, cinder fill, tar and gravel	38
	Patent roof (tar and gravel)	18
	Unlined Metal	78
GLASS	Single sash windows	84
	Double sash "	42
	Single skylight	90
	Double "	45
	Tile and concrete on earth	6

*For other differences multiply by factor given in Table II.

TABLE II.—CORRECTION FACTOR FOR VARIOUS TEMPERATURE DIFFERENCES.

	Multiply by
50 degrees	0.71
60 "	0.86
70 "	1.00
80 "	1.14
90 "	1.30

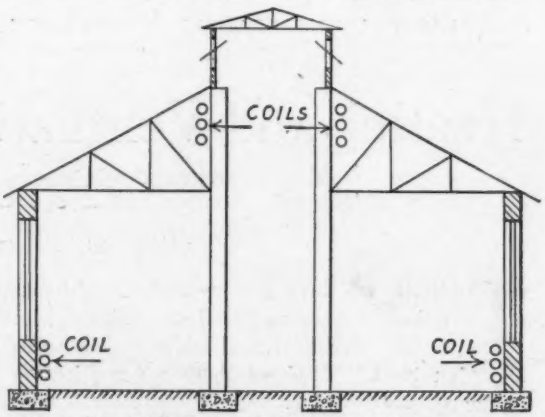
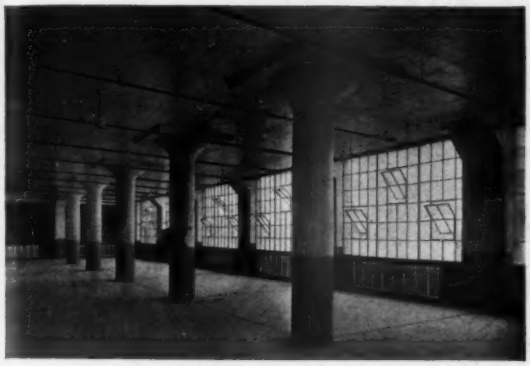


FIG. 2. ARRANGEMENT OF HEATING COILS FOR MONITOR ROOF CONSTRUCTION

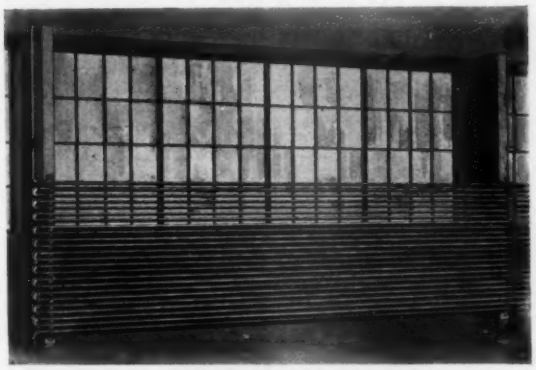


WALL RADIATORS INSTALLED IN RECESSES BETWEEN PILASTERS

In addition to the heat loss by transmission, there is also a certain amount due to leakage around doors and windows, and to a slight extent through the walls and roof construction. With average exposure to winds, this may be taken as 1.5 for wooden sashes and 1.25 for iron. That is the loss previously found by use of Table I is multiplied by these factors.

To find the total heat loss per hour from a given building, multiply the exposed outside wall, roof and glass surfaces in square feet, by the proper factors from Table I. Add the results and multiply the sum by 1.5 for wooden sash, or by 1.25 for iron sash. If there is a tile or concrete floor, multiply the floor surface by 6 and add to the general loss by transmission before making the correction for leakage.

Class B. Buildings of this type are confined chiefly to foundries, boiler shops, forge shops, etc., where the normal inside temperature may be comparatively low, as from 50 to 60 degrees in zero weather.



AN OBJECTIONABLE INSTALLATION

When the heating surface required is such that a single pipe coil would extend above the window sill, either a double coil or a compact bank of wall radiators should be used

Tests show that the transmission losses through unlined corrugated metal are very nearly the same as for a single window, and for all practical purposes no distinction need be made between the walls, roof or windows of a building of this kind. After taking into account transmission losses and leakage, a heat loss of 100 B. T. U. per hour per square foot of gross wall and roof area (counting windows as wall) will safely cover all ordinary conditions where the outside temperature does not fall much below zero.

Direct Steam Heating.

IN the case of industrial buildings the direct heating surface is usually installed in the form of circulation coils made up of 1¼ inch or 1½ inch pipe. Wall radiators are also used to a considerable extent.

In special instances it may be necessary to use pipe of other sizes to get the required amount of surface into the given space for pipe coils.

Under ordinary conditions circulation coils are best hung along the outer walls beneath the windows, as this is where the heat is most needed.

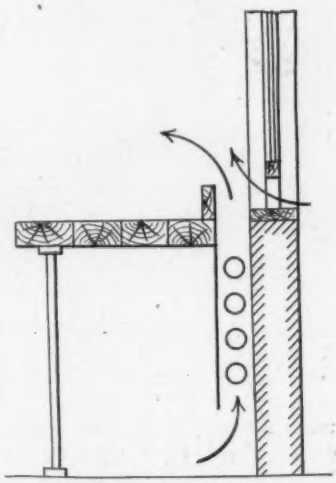


FIG. 1. A SUGGESTED ARRANGEMENT

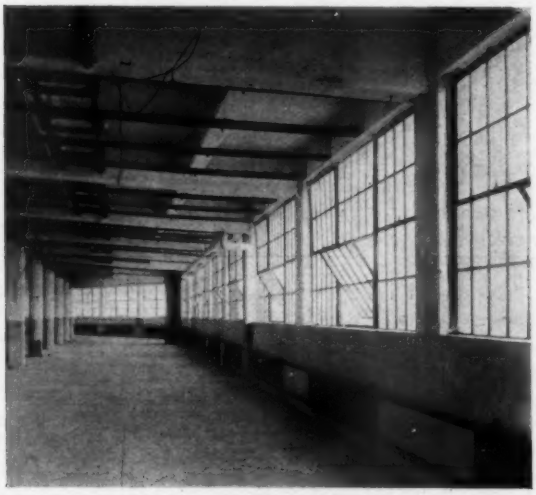
A good arrangement for a shop is illustrated in Fig. 1, in which case the bench is set out about 4 inches and an apron of galvanized iron carried down on the rear supports to a point slightly below the lower pipe. With this plan the warm air is not thrown into the workman's face, as with the usual method, but passes upward in front of the window. By properly proportioning the height of bench and window, and raising the sash slightly, a good supply of fresh air may be obtained without objectionable drafts.

In small buildings, and in large ones also when divided into stories 10 to 14 feet in height, very good results may be obtained by this general arrangement.

Direct heating is especially adapted to cases where the plant is made up of a group of small or medium size buildings instead of one or two large ones, as the duplication, in this case, of fan and heater outfits would prove quite expensive. Again,

direct radiation is convenient for heating special rooms or departments requiring different temperatures from the main shop, such as offices, drafting rooms, shipping rooms, paint shops, etc.

The principal disadvantage of direct heating, aside from the lack of ventilation, is that in buildings with an extended glass exposure, such an amount of heating surface is required as to make it



FACTORY BUILDING—THOMAS A. EDISON, INC., ORANGE, N. J.
Wall radiators used throughout

uncomfortably warm for those working near the coils. This is especially true in that type of modern building construction having considerable height, with galleries and monitor roofs. In this case the warm air rises rapidly to the upper part of the building, greatly overheating it, and increasing the rate of transmission through the roof. At the same time the zone near the floor, occupied by the workmen, remains too cold for comfort except in the immediate vicinity of the coils.

A typical arrangement for direct heating surface in a one-story building with monitor roof is illustrated in Figure 2. In this case part of the radiation surface is placed at an elevation so that it warms the monitor space and prevents cold down-drafts, while the lower walls and windows are cared for by coils near the floor.

One-story buildings, with saw-tooth roof construction, are satisfactorily heated by direct steam or water coils placed as shown in Figure 3. The illustration on page 545 shows an installation of wall radiators located along the saw-tooth roof construction.

Overhead coils should only be used in low rooms, and in cases where the pipes would interfere with machinery or other fixtures if carried on the walls. If the room is over 9 or 10 feet in height the amount of such surface should be increased from 10 to 20 per cent. above that when placed near the floor, in order to force more of the heat downward to the level occupied by the workmen. In some cases the building construction is such that recesses are formed between the pilasters, as shown in Figure 4. These are often utilized for the radiating surface by using double coils of the "return-bend" or "trombone" form, if of sufficient length and height to just fill the spaces and allow room for making the supply and return connections. The ordinary sectional cast iron radiator is not extensively used in work of this kind as it is desirable to extend the surface so as to get a better distribution of heat. Cast iron wall radiation is frequently used in industrial buildings when for any reason it is desired to present a better appearance, also in offices, etc. Frequently when pipe coils would obstruct the lower part of the window, cast iron wall radiators can be used to advantage. Several of the illustrations show such installations.

Amount of Radiating Surface. The square feet of radiating surface for a given room or building is found by dividing the "total heat loss" per hour, as found by the methods already described, by the "efficiency" of the type of radiation used.

The efficiency is the average number of heat units given off per square foot of surface per hour, and may be taken as follows for steam at 1 to 2 pounds gauge pressure.

	B. T. U. per hour
Pipe coils.....	290
Cast iron wall radiators.....	280
Common sectional radiators....	250

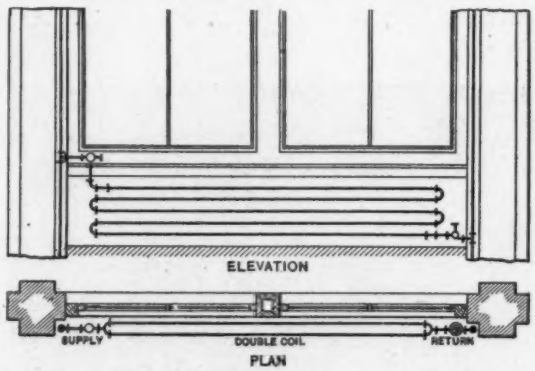


FIG. 4. HEATING COIL INSTALLED IN WALL RECESS

In distributing the radiating surface there should be from 20 to 30 per cent. more placed along the

colder and more exposed side of the building than on the other. If especially exposed to winds, the heat will tend to be driven with the air currents to the leeward side of the building and it may be necessary, in some cases, to place a still greater proportion of the heating surface on the windward side to offset this effect.

Piping Arrangements. All steam coils, and cast iron wall radiators in most cases, are connected up on the "two-pipe" system. The general arrangement will, of course, depend largely upon the type and use of the building, number of stories, etc. Usually the first floor or basement is utilized the same as the others, so it is not desirable to mass the supply and return piping at the ceiling of this room as is frequently done in other types of buildings where the basement is largely given up to piping and mechanical equipment of different kinds. In general, the supply and return branches should be distributed as much as possible over the entire building, and this is frequently simplified by using the overhead distribution, shown in diagram in Fig. 5. In this case a single supply riser is carried to the top of the building, with branches to the different drops just below the roof. With this plan the supply system is at the top of the building and the return in the basement. Another advantage is that the mains and branches close to the roof serve as radiating surface for warming this part of the building.

Another point in favor of the overhead system for work of this kind is the matter of drainage. In the case of industrial buildings the ground area is often large compared with the height, thus spreading out the supply and return systems and calling for long runs of horizontal piping.

With the general arrangement shown in Fig. 5 it is easy to provide a continuous downward pitch from the top of the main riser back to the receiving tank or boilers as indicated by the arrows, and furthermore, the flow of condensation and steam is in the same direction, which is a matter of much importance in securing good drainage.

Systems of Heating.

The systems of direct steam heating employed for this class of work are known as the "gravity return" and "return line vacuum" systems. In the first of these the condensation flows back to the boiler or receiving tank by gravity, the entire system of supply and return pipe being under the same pessure. With the vacuum system the usual return valve on the coil or radiator is replaced by an automatic valve which allows the passage of air and water but closes in the presence of steam. A vacuum pump is attached to the main return pipe, drawing out both air and water, which are discharged into a separating or receiving tank. From here the air passes to the atmosphere and the water is returned to the boilers in the usual manner by a separate feed pump.

In a tall building, or wherever the horizontal runs of piping are short and can be given a good pitch so as to secure proper drainage, there should be no difficulty in securing satisfactory results with a gravity return system. On the other hand, where the plant is more or less spread out, and especially if made up of a number of buildings so as to necessitate long runs of horizontal piping, a return line vacuum system is advisable. This is especially

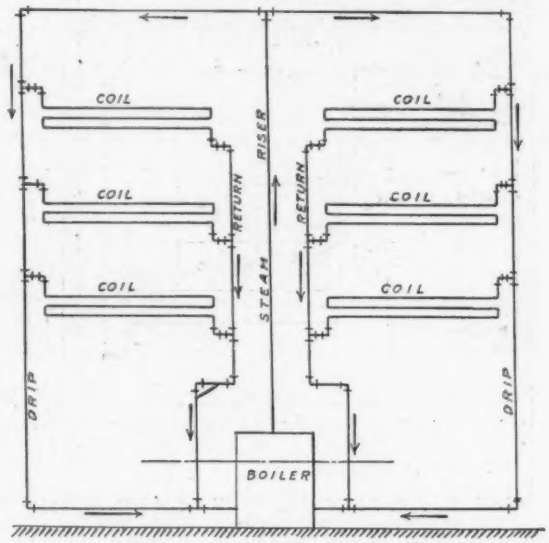


FIG. 5. PIPING ARRANGEMENT FOR OVERHEAD DISTRIBUTION

adapted to cases where new buildings or extensions have been added from time to time so that the original mains have become overloaded, and perhaps also out of line so as to form pockets for the accumulation of condensation.

Connecting a suction to the main return reduces the required pitch and prevents water hammer, which is likely to occur in plants of this kind operated on a gravity return. Steam may be circulated at or slightly below atmosphere, thus relieving instead of adding to the back pressure on the engines in case exhaust steam is used in the heating system. As a majority of industrial plants generate their own power and utilize the exhaust steam for heating purposes, this is an important item. In addition to this, a plant equipped with a vacuum system may be warmed up quickly in the morning, and when the coils and radiators are provided with graduated valves at the steam inlets, is capable of a fair degree of hand regulation.

In any case, only enough vacuum should be carried to insure a prompt removal of air and water from the coils and to lower the initial steam pressure on the heating system to approximately that of the atmosphere. A high vacuum tends to produce a leakage of steam through the automatic valves into the return main, which is undesirable.

Ordinarily a vacuum of about 2 inches is carried at the most distant coil or radiator, which will usually call for a vacuum of 3 to 10 inches at the pump, depending upon the lift and length of run.

Pipe Sizes. The sizes of the steam or supply pipes may be made the same for both the gravity and vacuum systems, and for average conditions may be taken from Table III, these figures being based on a drop in pressure of ¼ pound in each 200 feet length of run.

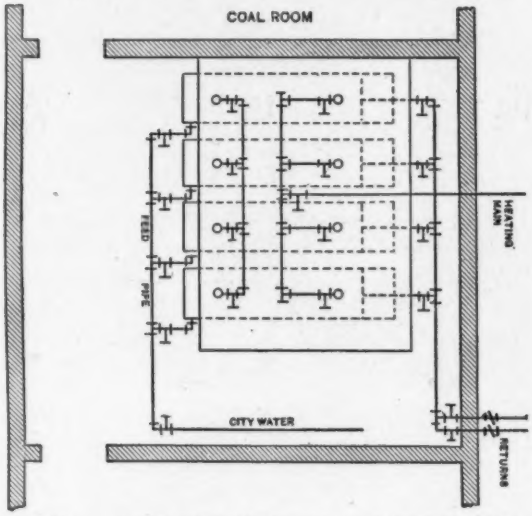


FIG. 6. ARRANGEMENT OF BOILER ROOM PIPING

TABLE III.—PIPE SIZES.
For gravity and vacuum systems except as noted.

Diameter of steam supply pipe in inches.	Diameter of return pipe in inches.*		Square feet of direct radiation it will supply.
	(Dry)	(Sealed)	
1	1	¾	40 to 60
1¼	1	1	60 " 100
1½	1¼	1	100 " 160
2	1½	1¼	160 " 350
2½	2	1½	350 " 700
3	2½	2	700 " 1,100
3½	2½	2	1,100 " 1,600
4	3	2½	1,600 " 2,300
5	3	2½	2,300 " 4,000
6	3½	3	4,000 " 7,000
7	3½	3	7,000 " 10,000
8	4	3	10,000 " 16,000

*For gravity systems only. The return pipe for a vacuum system may be made somewhat smaller than for gravity work owing to the suction employed for drawing the water through them. Return pipe sizes for return line vacuum systems are based on the square feet of direct radiation to be drained, and vary with the length of run. Data for this work is given in Table IV.

TABLE IV.—PIPE SIZES.
For return line vacuum systems.

Dia. of return.	Square feet of radiation drained. 200 foot run.	400 foot run.	600 foot run.
¾ inch	250	200	160
1 "	800	600	500
1¼ "	2,000	1,500	1,200
1½ "	4,500	3,500	3,000
2 "	9,000	7,000	6,000
2½ "	15,000	12,000	10,000
3 "	25,000	20,000	16,000
3½ "	38,000	32,000	26,000

Vacuum Pumps. Both direct-acting steam pumps of the single cylinder type, and motor or turbine driven rotary pumps are used in connection with vacuum heating.

While the former is wasteful in the use of steam, it is easily regulated to maintain any desired vacuum and is extensively used for this purpose. When there is an abundance of exhaust steam from the main engines for all heating purposes it is usually more economical to employ a motor-driven pump in plants of large size. Table V gives sizes of vacuum pumps for different quantities of direct radiation.

TABLE V—SIZES OF SINGLE CYLINDER VACUUM PUMPS.

Square feet of radiation	Size of pump*
2,000	3-in. x 4-in. x 4-in.
4,000	4-in. x 5-in. x 5-in.
6,000	4-in x 6-in. x 5-in.
8,000	5-in. x 6-in. x 6-in.
10,000	5½-in. x 6-in. x 7-in.
12,000	5½-in. x 7-in. x 7-in.
15,000	6-in. x 7-in. x 8-in.
20,000	6-in. x 8-in. x 8-in.

*In reading the pump dimensions the first figure indicates the diameter of steam cylinder; the second the water cylinder, and the third the length of stroke, all in inches.

Different makes of pumps will vary somewhat in their dimensions for the same capacity, but the above, rated on a steam pressure of 100 pounds, will serve as a guide in making a selection. When the pump suction is larger than the corresponding return, it should be bushed down to the same size. Vacuum pumps, like all other special equipment of a similar kind, should always be furnished in duplicate in order to guard against accident.

Boiler Room Piping. The simplest arrangement of boiler room piping is that shown in Fig. 6, which illustrates a battery of four low-pressure heating boilers with a gravity return of condensation from

the heating system. The steam connection from each unit leads into a cross-drum or header, from which the heating main is taken as indicated. An equalizing pipe extends across the boilers parallel with the main header, thus providing a direct connection between them through a pipe which is employed for no other purpose. While the main steam drum may serve as an equalizing pipe to some extent, the rapid flow of steam through the boiler connections tends to prevent a proper balancing of the pressure between the different units and thus causes the water to be lowered faster in certain boilers than in others and so produces an unstable water line throughout the battery. With the arrangement shown in the illustration, with the check valves in the main returns instead of in the individual boiler connections, the water line should stand the same in all of the boilers. A connection is made between the city pressure and each boiler for filling it independently of the others. Blow-off connections, not shown in the drawing, should be provided for purposes of drainage and cleaning, and should be so made as to enable each unit to be handled independently. Such a piping arrangement is only employed in plants purchasing electric power from a central plant, and where the boilers are simply used for heating.

The more usual arrangement is shown in Fig. 7 where power is generated on the premises and the exhaust steam from the engines or turbines utilized in the heating system.

The layout shown applies to a system operating with a gravity return of condensation to the receiving tank. Steam from the boilers is piped directly to the engines, with a branch leading to the low pressure heating main through a reducing valve. One end of the exhaust main from the engine leads outboard through a back pressure valve, while the other connects with the heating system through an oil separator. There is another branch connecting with a feed-water heater, as indicated. The main return from the heating system discharges the condensation into a receiving tank, from which it is pumped back to the boilers through the feed-water heater. When the exhaust exceeds the heating requirements, the pressure rises slightly, thus opening the back pressure valve and discharging the surplus outboard. If the exhaust is not sufficient,

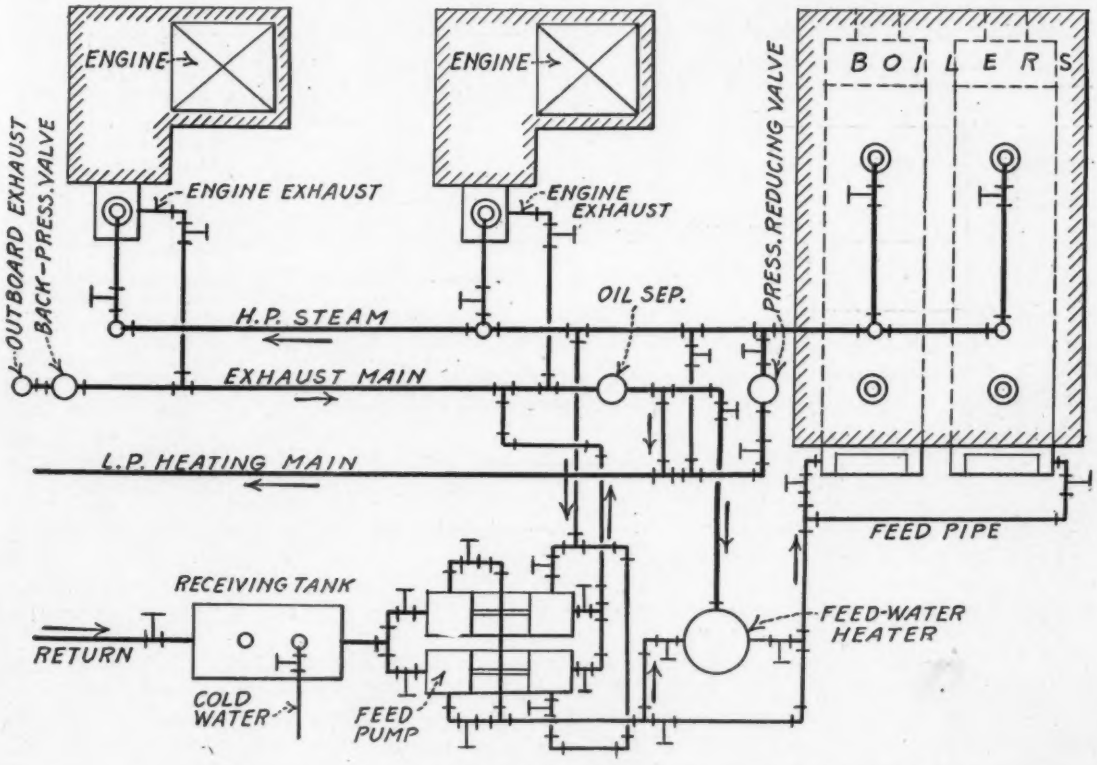


FIG. 7. PIPING LAYOUT WHERE EXHAUST STEAM IS UTILIZED FOR HEATING

then the pressure in the heating system falls slightly and the reducing valve opens and admits live steam at a reduced pressure to the heating main, the operation of both valves being entirely automatic. There are two ways of returning the condensation to the receiving tank. In the "closed system" the top of the tank is connected with the heating main or a nearby return pipe, thus maintaining the same pressure in the tank as in the heating system, so that the water flows back by gravity. In the "open tank" system, the receiver is vented to the atmosphere and the condensation discharged into it through a steam trap. The closed system is adapted to small plants where the pressure is well equalized throughout the piping, but for extended layouts, and especially where there are two or more buildings, it is better to use an open tank and trap the condensation into it from the different sections or building. The return pumps should be in duplicate to guard against accident, and one generally operated automatically by a float in the receiving tank or by a pump governor which maintains a constant water level.

The only essential difference in the boiler room piping between a vacuum system and the one illustrated in Fig. 7 is in the addition of a vacuum pump between the main return and the receiving tank. A typical layout of the return connections for a system of this kind is shown in Fig. 8. The main return pipe comes in at the right and the condensation passes through a strainer before entering the pump. A cold water jet is provided at this point for use in case there is considerable leakage of steam into the return main through defective valves. The vacuum pump is provided with an automatic regulator, which operates it at just the required speed to maintain the desired vacuum. This is shown in the steam pipe to the pump and is actuated by the pressure in the return main. Water and air from the vacuum pump are discharged into the receiving tank, where separation takes place, the air passing outboard through the vent pipe and the water being returned automatically to the boilers the same as in the gravity system previously described.

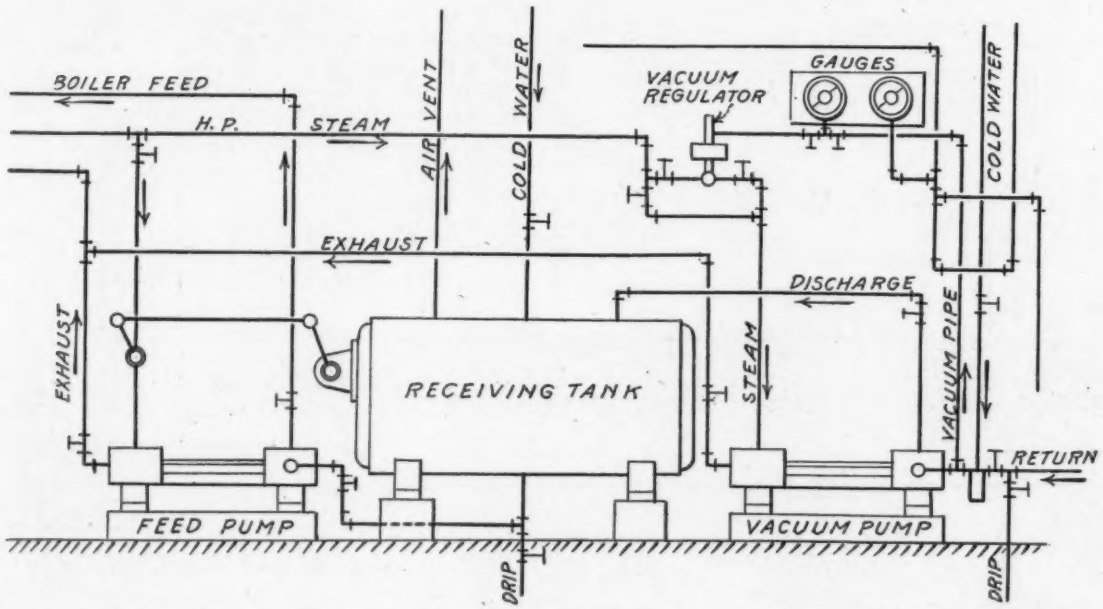


FIG. 8. ELEVATION SHOWING ARRANGEMENT OF PIPING, PUMP, ETC., FOR A VACUUM SYSTEM

Engineering Notes of Interest

Production and Use of Magnesite

The production and use of magnesite was stimulated considerably during the war period because it enters largely into refactories in the metal industries. This is especially true of the magnesite from Montana and Washington. Quite a percentage, probably three-fourths of that produced in California, was calcined and used in the plastic trade mainly for the making of what is known as sorel cement for floor and stucco purposes.

The total output of crude magnesite in 1919, according to a Geological Survey Report, was 162,000 tons, the production being mainly in Washington, Montana, California and Texas. Most of the Washington product went to the steel mills as did also part of the California product, but the main part of the California product went into plastic industries.

The Northwest Magnesite Co., of Chewelah, Wash., is the largest producer of Magnesite, the other producers in Washington are the American Mineral Production Co., Valley, Wash. The principal producers in California are the Porterville Magnesite Co., Porterville, Cal., and the Tulare Mining Co., at Red Mountain, Cal., the White Rock Mine in Napa County and several others.

So far there has been no great resumption in the imports of magnesite and because of this fact hope is held out that 1920 should prove a very good year in magnesite development, both for refactories and for plastic uses, notwithstanding the passing of those urgent demands created by war conditions.

Forest Extension Service

"The red pine trees now being planted near Syracuse as well as in other parts of the state may be those upon which the next generation will have to depend for seed for future planting of this valuable lumber tree. The supply of seed today is extremely limited, and is far less than the demand."

This is the significant statement made by Prof. John W. Stephen, head of the silviculture department of the New York State College of Forestry at Syracuse, who has been instrumental in making several plantations of red or Norway pine in various parts of the state. He says in adition:

"Dean Toumey of the Yale Forest School, when in Syracuse in June, declared that he was able to obtain only one and a half pounds of red pine seed last fall, after a vigorous campaign of advertising widely through the region of its distribution.

"This means a really serious condition, and the greatest care must be taken lest this valuable tree becomes practically extinct. Red pine is one of our very important timber trees, and is especially desirable for planting throughout its range, because of its immunity from disease, and insect depredations. This makes the difficulty of obtaining seed and its growing scarcity of tremendous importance.

"Because of the danger of attack on the white pine by the white pine blister rust, a fungous disease, and the white pine weevil, an insect that stunts the growth of the white pine, the red pine is replacing the white pine largely in reforesting operations. Its use is limited, however, by the scarcity of the seed. The plantations already established in the vicinity of Syracuse, therefore, will be a valuable source of seed supply for the forests of the future."

Engineering Council Bulletin

Federal Power Commission.—Applications covering 4,000,000 horse power are expected before January 1. This is more water power work than has been handled by the Government in past fifteen years. Under the old plan about $250,000 was spent annually to care for water power work. This makes it apparent that the present appropriation of $100,000 for the Federal Power Commission is totally inadequate. American Civic Association and National Park Association has started propaganda against Water Power Act as it effects National reservations. This action appears groundless because the Commission has announced that no applications will be accepted for projects located on National parks, and Senate committee has promised to write such provision into the Act when Congress reconvenes.

Shipping Board, Nomination of Members.—Difficulty in obtaining qualified men for the shipping board under the condition of temporary appointment and the lack of provisions for salaries of the members under the new law makes it probable that the President will wait until Congress convenes before making nominations for present vacancies.

Engineering Courses for ex-Service Men.—The Federal Board for Vocational Education has arranged with various schools of engineering in all parts of the country for engineering courses for 2,387 ex-service men in all branches of engineering. Similar arrangements are being extended as universities start courses for the current year.

Steel Basing Point.—The Federal Trade Commission has decided to hold a rehearing of the complaint recently brought before them by the Western Association of Rolled Steel Consumers against the U. S. Steel Corporation. The reargument will be-

gin November 15, in which Western steel fabricators will make another effort to do away with the use of Pittsburgh as a basing point for steel prices. The last hearing resulted in a decision in favor of the interests of the U. S. Steel Corporation.

Management Education.—A course in this subject aimed to provide sufficient number of properly trained executives for industries of the United States is to be established in majority of American colleges according to announcement by Dr. Hollis Godfrey, president of Drexel Institute and formerly member of advisory commission of Council of National Defence.

American Engineering Council to Hold First Meeting November 18

Arrangements have been made to hold the first meeting of American Engineering Council of the Federated American Engineering Societies at the New Willard Hotel, Washington, D. C., November 18 and 19. The program as announced follows:

Thursday, November 18, 1920.

Morning session: Registration of delegates.

Opening session of American Engineering Council.

Call to order by Richard L. Humphrey, Chairman, Joint Conference Committee.

Election of Temporary Chairman, Secretary and Committees on Program, Credentials, Constitution and By-Laws, Nominations, Plan and Scope, Budget and Resolutions.

Afternoon session: Address—"Engineering Council"—J. Park Channing, Chairman.

Discussion of the field of activity for the Federated American Engineering Societies.

Friday, November 19, 1920.

Morning session: Report of Committee on Nominations.

Election of Permanent Officers.

Report of Committee on Constitution and By-Laws.

Formal Ratification of Constitution and By-Laws.

Report of Committee on Plan and Scope.

Afternoon session: Report of Committee on Budget.

Report of Committee on Resolutions.

Evening session: Introductory remarks by presiding officer, the President of American Engineering Council.

Address by Herbert C. Hoover, President, American Institute of Mining and Metallurgical Engineers.

Informal reception and smoker.

Saturday, November 20, 1920.

Organization Meeting, Executive Board, American Engineering Council, of the Federated American Engineering Societies.

Engineering Board Appointed for Delaware River Bridge

According to the agreement between the Pennsylvania and New Jersey Commissions having supervision over the construction of the Delaware River bridge between Philadelphia, Pa., and Camden, N. J., one engineer was to be selected from each state and a third from a neutral state, these three to constitute the engineering board having direct charge of construction. The engineers appointed are Ralph Modjeski, of Chicago and New York, George S. Webster, Chief of the Bureau of Surveys, Philadelphia, and Lawrence A. Ball, of Orange, N. J. All are members of the American Society of Civil Engineers.

Bituminous Coal Storage Practice

The Engineering Experiment Station of the University of Illinois has just issued Bulletin No. 116 prepared by Professor H. H. Stoek, C. W. Hippard and W. D. Langtry, which bears the above title.

The authors point out the fact that fuel shortages are largely caused by the inability of existing transportation systems to handle a greatly increased winter tonnage of fuel because already overloaded by unusually heavy tonnage from other sources. As a remedy for this condition, they suggest that as large a proportion as possible of the total fuel tonnage be handled during those months of the year when traffic conditions are not so acute. If this is done, it would, of course, necessitate the storage of large quantities of fuel at or near the place of use.

Heretofore, more or less trouble has been experienced in the storage of quantities of bituminous coal, from fires, due to the spontaneous combustion of the fuel, this fact retarding to a large extent the practice of fuel storage on any considerable scale. Now that it has become so necessary to store coal, a more careful and extended study of the causes of spontaneous combustion in coal piles has been made. In this respect this bulletin contains much valuable information on the subject, devoting considerable space to actual experience with storage piles. Where fires have occurred, the causes have been carefully investigated and reports made thereon. This information should prove of great value to every prospective storer of coal. Copies of Bulletin No. 116 may be obtained without charge by addressing C. R. Richards, Director, Engineering Experiment Station, University of Illinois, Urbana, Illinois.

XUM

Current News

Happenings and Comments in the Field of Architecture and the Allied Arts

Builders' Exchange to Hold Exhibit

The Builders' Exchange of Minneapolis, Minn., will hold a building and manufacturing show in that city, during the month of February. Elaborate plans are being made to have this one of the largest shows of its kind held in that territory.

Canada to Replant Forests

The Quebec government plans to plant two pine and spruce trees for every one cut down, and has at present six hydroplanes patrolling forest areas, while at the same time it is encouraging private forest protection. Three million pine and spruce trees have been planted this year and seven associations of lumbermen organized for timber development.

A Building Boom in Mexico

A building boom has struck Mexico with the advent of the first real peace the inhabitants have experienced in many years, judging by late reports.

Practically every city of more than ten thousand people has reported much building activity.

Contractors have been asked for bids on paving, drainage systems, factories and railroad reconstruction.

Town-Planning a Necessity

The familiar rush of the people from the land to the cities, so pronounced a feature of modern times, has encouraged congestion in most communities. Recourse to town-planning has been forced by the necessities of efficient transportation and sound land values, as well as good health.

It is fashionable today to deplore the slums. Why provide new ones? Why add congestion to existing congestion, when, simply by looking ahead and taking thought, healthy growth may be assured?

Town-planning provides the city with eyes to see where it is spreading and to conform to the demands of business and comfort. A city unplanned is a blind giant, sprawling over the ground. It wastes some of its greatest assets in a building debauch.

Every city that keeps order on its streets must also keep order in its advance to greater size and influence. It must put town-planning traffic experts at important corners on its way.

Largest Room Without Columns

The largest room without columns is said to be in a solid concrete building of the mosque in Lucknow, India. It is 162 feet long, 54 feet wide and 53 feet high. The timber mold was left a year for the concrete to set, and the building, 125 years old, is still unimpaired.

Exchange Council Formed in East

An organization to be known as the Tri-City Builders' Exchange Council with the object of protecting and promoting the building business, was formed at a meeting of the builders of Albany, N. Y., Troy, N. Y., and Schenectady, N. Y. The council is particularly anxious to secure harmonious relations between the builders and their employes and between the builders and the architects.

Ship Brick by Parcel Post

When it comes to shipping brick by parcel post there is no gainsaying that transportation difficulties have hit construction a body blow. John B. Cahoon, of the Salt Lake Brick Company, states that his company shipped 15,000 face brick in that manner from Salt Lake City to Vernal, Utah. Each brick was wrapped in paper and then packed in crates of ten bricks each. The consignment cost fifty-five cents a package and the whole consignment was not shipped in one day, because to have done so would have congested the service.

Small House Service Bureau for Illinois

The Board of Directors of the Illinois Society of Architects at their September meeting appointed a special committee of the Board to incorporate the Illinois Architects' Small House Service Bureau, the incorporation to be modeled after the Architects' Small House Service Bureau, Inc., of Minnesota.

Those interested in better architecture for small houses may communicate with Charles H. Hammond, 64 East Van Buren Street, Chicago, Ill., Chairman of the Special Committee of the Board having this matter in charge.

Ten-Hour Air Route to Link United States with Alaska

Skagway, Alaska, is to be only 10 hours distant from Seattle, Wash., when, some time next summer, an aerial mail, express and passenger service is instituted. Back of the project are various chambers of commerce, and in particular, a western flying-boat corporation. This concern is now busy with the construction of the ships and with the survey of the 1,000-mile route. This course will seldom emerge from the shelter of the islands that parallel the coast.

Open Carload of Cement Is Protected by Own Crust

In filling a recent carload order of cement an Illinois concern, as an experiment, dumped the entire 208 barrels into an open coal car, sprinkled the surface with water, and started it on a 260-mile trip. The hardened surface formed a water-proof crust an inch thick, estimated to be ample for the cement underneath. But the car was started too soon, the surface cracked, and a rainstorm soon thickened the crust to 4 or 5 in., with a loss of some 50 bbl. The material below was in perfect condition, however, and the shippers believe a properly hardened crust, requiring but 6 to 8 bbl., will prove an economical and efficient packing.

Chinese City Becomes Modern

Expansion is always the order of the day in an active community; and the old city of Ningpo has given proof of her vitality by allowing her age-worn walls to be pierced by a new gate. This is situated about half way between the north and the west gates, and has been made chiefly for the convenience of workers in a grass-mat factory on the outer edge of the city foose at that point. No doubt the promoters of the factory have been the moving force in bringing in this innovation and the gate symbolizes their hopes, being named the Gate of Gain.

This mat factory was begun in a small way inside the city about two years ago. Last year it was moved to some old buildings in its present position, about thirty more of the surrounding rice fields bought in, and new buildings erected. There are now about 1,000 workers ,the majority of whom are women and girls; and a wooden bridge is soon to replace the slow moving ferry between the factory and the new city gate.

The women are paid by piece work, and the skilful can earn up to 40 cents a day. Besides mats of various sizes and designs, dainty grass slippers are turned out soled with leather. Some of the mats are made with the object of replacing in the market Japanese mats of a similar kind, the patterns on show are very attractive.

Amazon Valley Riches Are Undeveloped

The Amazon Valley is said to be the greatest undeveloped region in the world which is yet untouched. The soil is said to be extraordinarily fertile. The forests offer woods in inexhaustible variety, many of them cabinet woods of rare value. Of vegetable oil nuts, a tenth part only is known to the outside world, says the Indianapolis News. Raisins, gums, spices, medicinal plants and fibers abound in infinite variety. Kapok grows along the banks of most of the main rivers, but not a pound of it is exported to the United States, although America imported 7,000,000,000 pounds last year from far-away Java. There are mineralized areas said to contain coal, iron, gold, silver and precious metals of many kinds. They have not yet been prospected.

Building Blocks Interlock with Herringbone Grooves

Building blocks of concrete, tile, or other suitable material, are made to interlock by an ingenious formation of their top and bottom surfaces, in the design of a Wisconsin inventor. V-shaped grooves arranged in herringbone order, at a 45 degree angle, are formed in the blocks. The special unit used at corners has the axis of the herringbone design running transversely on one-half the surface, and longitudinally on the other half. Such blocks used in building a wall fit accurately together, and cannot be moved in any direction.

Palestine Is Transformed

A very interesting geological change states the *North China Herald* is taking place in Palestine. Of all countries in the world Palestine a short time ago looked the most forlorn, the least capable of achieving physical beauty. Yet she is experiencing a comely rebirth. A visitor to Palestine a few years ago would have been depressed by the vista of dull gray rock. The country seemed to be nothing but acres and acres of conglomerate rocky surface. One looked in vain for a flowering shrub or a stretch of green grass.

It has been discovered that this barren, rocky, surface, which has been hardened by exposure to the sun for years, on being covered disintegrates into a rich soil. Modern science has drilled ditches through

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the flint-like substance and covered the remaining surface of the rock with clay or dead leaves. In a short space of time the rock softens and breaks up under the covering, which is then removed, and the soil, irrigated by the ditches, is planted with grain, fruits and vegetables.

After tramping over miles of rock that have not as yet received the attention of the cultivators, it is very refreshing to round a hill and find, unexpectedly, meadows of waving grain.

Liege Defence Memorial

The province and town of Liège have decided to erect a monument commemorating the defence of Belgium against the German invader. A sum of 1,000,000f. has been subscribed for the project. The design for the memorial will be decided by a competition open to architects and sculptors of Belgian nationality or subjects of the Allied Powers. The conditions of the competition may be obtained from M. Léon Maréchal, Bureau des Beaux-Arts, Hotel de Ville, Liège, Belgium. A map of the selected site will be sent on receipt of 5f.

London Has Hotel for Infants Only

Life in the city of London is becoming so complex, because of the house shortage, that many families are being forced into apartments and hotels where babies are not recognized. Two enterprising nurses have met the emergency by opening a hotel for infants only, catering to transient as well as resident business. The wall decorations of the rooms in this curious inn run largely to ducks, chickens, and similar figures, while the standard furnishings are white cots with pink curtains. A house physician and dentist are features of the establishment. The charges range from about $13 a week for the very young, to $21 for the older guests. Parents are permitted to call as often as they please.

Put Sidewalks in Buildings to Make Streets Wider

In undertaking the seemingly impossible task of widening the business streets of their city without moving the buildings, engineers of Nice, France, have almost succeeded in making two things occupy the same space at the same time. They have converted the old sidewalks into street space, and moved the front windows and doors of the buildings back far enough for a new sidewalk, under the overhanging second stories, to support which the original pillars are left standing. The plan is similar to that quite usual one in Southern California and other warm western states. It is quite economical, and the new walks have the unusual advantage of protection from sun and rain for those who travel them.

White House Modeled After Palace

The White House at Washington, which after March 4 next will have a new tenant, received its name from the fact that it was built of white free stone. The site for the building was chosen by President George Washington and Major Peter L'Enfant when they laid out Washington in 1791. Its architect was James Hoban, of Dublin, who modeled the structure after the palace of the Duke of Leinster. The cornerstone of the building was laid October 13, 1792, and its first occupants were President and Mrs. John Adams, who moved in during November, 1800. After it was burned by the British in 1814 the original architect returned and supervised its restoration. The original cost was defrayed by the sale of land donated by Maryland and Virginia—Detroit News.

Bank Built of Rocks from Near-by Fields

The only bank building of its kind in the world, the owners call a structure in a town of northern South Dakota. The claim is made because the walls are built entirely of glacial bowlders collected a few years ago from the fields and prairies about the town. The work of preparing the stones occupied the better part of a year and was done by one stone-mason unassisted. He first split the bowlders with iron wedges, to reveal the original colors of pink, red, purple, brown, yellow and gray. Then they were cut to size and squared. Incorporated in the walls they have retained their striking coloring, and have imparted to the structure unusual strength and permanence. Quarried stones, and not the glacial rock, were used, of course, in building the portico.

Excavation May Be Resumed at Herculaneum

The director of museums and excavations in southern Italy, it is announced, is now agitating the resumption of work at Herculaneum, the ancient city on the western slope of Mt. Vesuvius. He desires particularly to uncover an undamaged Roman house, with all furnishings and ornaments in place. This he has never been able to do in Pompeii, but he feels that such a discovery should be made in Herculaneum. This city, it may be recalled, was not overwhelmed by a fall of stones, followed by a rain of ashes, but was simply engulfed in a flow of water, earth and small stones. While obliterative, this torrent was not, in a way, destructive.

XUM

The director has additional reason for his hope in the record of discoveries already made in the theatre, basilica, forum and villas. From these have been taken intact many marble and bronze statues, mural paintings, and one papyrus library of 1,803 volumes. Most of these antiquities were brought to light at the time of the first excavations, in the period 1738-1780. During these years tunnels were driven in all directions, though many authorities maintain that the area investigated was proportionately small. Since that time little has been done at Herculaneum because of legal, political and financial difficulties.

Business Men and the Fire Waste

The Chamber of Commerce of the United States, at its 1920 annual meeting in Atlantic City, adopted resolutions declaring strongly in favor of reduction of the preventable fire waste. The organization includes 1,300 national and local associations, having an aggregate membership of nearly 700,000 business concerns. Discussing increased production and thrift, resolutions made the following declaration on fire prevention:

"At a time when increased production is of the first importance destruction of means of production continues on a great scale. Each year approximately $300,000,000 in property values are being destroyed in the United States through fire. A large part of this value represents waste that can be prevented. Considerations which should appeal to every individual require that, even if conditions were normal, the endeavors which are being made to stop this needless waste, with its detriment to the public interest and its private burden for all citizens, should be redoubled. At a time when economy and conservation of our resources must be paramount, in order that every effort may have its full influence toward increasing production, it becomes the immediate duty of each person, each association, and the whole nation to put an end to preventable waste through fire."

Famous Doors of History

Among the famous doors of history are the carved wooden doors of the church of Santa Sabina, Rome, depicting in relief, scenes from the Old and New Testament. These are one of the most remarkable examples of early Christian sculpture extant. In the earliest times, as in Babylon, doors swung on sockets instead of hinges. In Roman days wooden doors were decorated with bronze and inlaid, and throughout the Middle Ages richly carved doors of wood adorned the churches. In the Gothic period, wooden doors were decorated with wrought-iron hinges which were often elaborated into intricate ornamentation covering a large part of the door. The doors of the Cathedral of Notre Dame in Paris of the thirteenth century are the finest examples of this class. During the Renaissance in Germany and France, elaborately carved doors were among the most beautiful products of wood sculpture. Some of the old English doors were formed of narrow planks placed side by side and in dwelling houses generally, in the Middle Ages the doors were small and fairly simple, meant for strictly practicable purposes and often provided with some means of defence. The doors of the Norman period were round-headed, while with the thirteenth century, came the doorway with the pointed arch and later the flattened arch. In the case of interior doors, splendid old polished mahogany doors were important features in some old English homes and there were old oak doors of wonderful beauty, especially when found in oak-panelled rooms.—National Lumber Manufacturers' Association.

Few Buildings are Painted in Turkey

Turkey is a paintless land. Most of the houses are wooden and unpainted. This is not a condition growing out of the war. The short-sighted policy of the government in imposing taxes on buildings in proportion to the sightliness of their exterior has encouraged shabbiness.

Even in Constantinople a large percentage of the residences and many of the business houses are of wood. Many of the large apartment houses and office buildings have brick or stone fronts, but wooden sides and backs. Hence the disastrous fires which have laid more than one-third of the city in ashes since the beginning of the war, and the general terror of the population when a fire alarm sounds.

Constantinople and most other Turkish cities would doubtless have been destroyed by fire long ago were it not that the shabby wooden and semi-wooden buildings have tile roofs. These roofs of bright red tile are in striking contrast to the dingy grey walls, rotted and stained by the weather.

In the past Turkish tax assessors frequently imposed twice as high a rate upon a well-painted house as that levied upon an unpainted house of exactly the same construction in a similar locality.

Waste Heat to Be Used to Reduce Fuel Costs

Utilization of heat now going to waste from the kilns of the Bath Portland Cement Co., near Bath, Pa., will save forty-eight tons of fuel a day, according to engineers who have studied the proposed plan

XUM

of the company to reduce its fuel expenditures. The kiln heat is 1500 degrees Fahrenheit, and it is estimated that 75 per cent of this wasted energy can be harnessed and put to use in producing steam for the plant. In furtherance of this plan the company has ordered boiler equipment worth $250,000 from a Philadelphia plant, which will be installed early in 1921.

Managers of other heavy coal-using plants are watching the experiment with a great deal of interest for, if the plan were adopted throughout the Lehigh cement district, it would result in a $4,000,000 cut in the annual fuel bill.

News from Various Sources

According to the National Industrial Conference Board, the increase in the five major items in the cost of living between July, 1914, and July, 1920, was as follows:

	Per cent
Food	119
Shelter	58
Clothing	166
Fuel, heat and light	66
Sundries	85
Average	104.5

* * *

A stone hewn from the bridge over the Marne at Chateau-Thiery, where American troops halted the German drive in the Summer of 1918, will be used as the cornerstone of the War Memorial Building, which will house the national headquarters of the American Legion.

* * *

In the six years from its beginning in 1914 to the present time world indebtedness grew from $44,000,000,000 to approximately $265,000,000,000, an actual increase in six years of over $200,000,000,000 as against an average of a little more than $1,000,000,000 per annum in earlier years.

* * *

A catalogue of some 600 books on architecture and the allied arts, in English, French and German may be obtained from John Tiranti & Co., 13 Maple Street, Tottenham Court Road, London, W. 1, where they are offered for sale. Telegraphic address, Tiranbosel, Ensroad, London.

* * *

Airplane mail service between the United States and Cuba is to be inaugurated this fall, according to an announcement made by Postmaster-General Burleson.

Personals

Max A. Bernhardt has enlarged and improved architectural offices at 721 Walnut St., Philadelphia, and desires new catalogues.

Lehmann & Kuehrmann announce their removal to 506 New Two-Republics Bldg., El Paso, Texas.

George Zunner, for many years in the Hartford Trust Co. Building has moved to 182 High St., Hartford, Conn.

F. L. Clepper, structural engineer, formerly with the Watson Engineering Co. of Cleveland, is now identified with the office of M. M. Konarski, architect to the Board of Education, Akron. Catalogues and samples desired.

M. M. Konaski has been appointed architect for the Akron, Ohio, Board of Education, offices in the Central High School Bldg. Samples and catalogues desired.

C. Frank Jobson is now practicing architecture under the name of Jobson & Hubbard, at 225 North Michigan Blvd., Chicago.

Clarence J. Parman has opened an office at 1521 Nicholas Bldg., Toledo, Ohio, for the practice of architecture. Manufacturers' samples and catalogues are desired.

F. T. Schneider, architect, 1314 F St. N. W., Washington, D. C., has moved to 1006 Massachusetts Ave., that city.

H. Robert Diehl and Samuel N. Vance, architects and engineers under the name of Diehl & Vance, New Monroe Bldg., Norfolk, Va., have dissolved partnership by mutual consent. The business will be continued by Mr. Diehl, with offices in the McKevitt Bldg., Norfolk, Va.

S. K. Yaukey, architect, 66 E. Main St., Waynesboro, Pa., has moved to 50 S. Potomac St., that city.

Ernest H. Schmidt, Glencoe, Minn., has associated himself with Albert Schippel in the practice of architecture at 309-11 Coughlan-Hickey Bldg., Mankato, Minn. The firm will be known as Schippel & Schmidt. They desire new catalogues and samples from material concerns.

Weekly Review of the Construction Field

With Reports of Special Correspondents in Prominent Regional Centers

The Road to Ruin

THE news columns have related and this newspaper has discussed the downward slide of crop prices with $4,000,000,000 of price recently wrenched out of the market quotations of the three staples, wheat, corn and cotton, editorially comments the New York *Herald* in connection with a letter from a correspondent, which is also reprinted herewith. Continuing this editorial states: From a hard headed American farmer expressing himself simply but manfully on the subject we print elsewhere a letter both brimming with sound economic sense and presaging the inevitable fruits of the supreme laws of nature.

This hard headed American farmer delivers the plain warning that the producers of the nation's food and other necessaries of life are not going to toil into bankruptcy while Government mismanagement squanders billions of dollars and while slackers and wasters organized to get high wages but not to earn them strip those who dig our national wealth out of the soil.

This hard headed American farmer sets forth the bald truth of the responsibility of Government inefficiency and extravagance for a large part of the high cost of living. And he declares that grossly overpaid but deliberately non-earning workers now have the choice of fitting their wage scales to the readjusted economic conditions or of losing their jobs.

It is a cold fact, as the hard headed American farmer says, that it is wanton and ruinous destruction of nature's supplies intended for the nourishment and comfort of mankind when a Government flings away its opulence like a drunken sailor. The national Government has been taking billions of dollars of the public's money, which is the public's bread and meat, the public's shelter and raiment, the public's necessaries and comfort—the national Government still takes it and makes an economic bonfire of it. State governments and municipal governments take billions more of the public's money and make other bonfires of it.

And it is a cold fact, as the hard headed American farmer says, that while the producer back on the land has been laboring hard and long hours to provide the nation's food and raiment, organized individuals, organized to get a bigger and bigger share of the production but to do less and less work for it, have been raiding his granary. The hard headed American farmer says this unfair division is going to stop.

The hard headed American farmer offers no objection to lower prices for his hard earned product if other prices are similarly adjusted. He knows from his own war price experience that no matter what dollar marks are on his wheat he is better off when three bushels of it will exchange into a pair of shoes than when two bushels of it will exchange into only one shoe. He knows from his own war price experience that 100 bushels of corn exchanged into a set of harness makes a wiser bargain than 250 bushels of corn exchanged into a set of harness. He knows from his own war price experience that he is the goat, as he puts it, when a big bin full of grain is the equivalent of a little tinkering by a plumber who has his tools carried for him by an apprentice whom the farmer pays to learn his trade.

The hard-headed American farmer who has been getting for his work and his yield more dollars, but fifty cent dollars instead of fewer one hundred cent dollars, is perfectly content to go back to getting half as many sound dollars for his work and his yields. But he does not propose to go back to prewar prices for his crops and then take plugged nickels as well for his honest wheat and corn.

So this hard headed American farmer, as all hard headed American farmers will do, sends his message to Mr. Sam Gompers or to any other labor union politician who rants and threatens that all commodity prices must come down but that the inflated wage shall not.

It will come down, as the hard-headed American farmer says, because when there is now $9,000 of labor cost alone in what used to be a $6,000 house rents cannot come down until those inflated labor costs come down. But nobody will build houses to give the labor engaged on them $9,000 for a house worth all told $6,000.

It will come down because a suit of clothes that used to cost the wearer $30 cannot go back to $30 when there is now $50 of labor cost in it. And the public is not going to pay the laborer $50 for making a $30 suit of clothes.

It will come down because the farmer will not give fifty-six bushels of wheat for a piece of lead pipe, a couple of washers, and a plumber's stroll around the garden. He will not raise the wheat to throw away in such a swap.

It will come down because when the farmers call a halt, as the rest of the public is now calling a halt, on wages without work, whether of brains or of brawn, and on goods without value, whether of the open shop or the closed shop, the only other

choice for the man who will not do a square day's work for a square day's pay will be no job and the bread line.

Following is the letter that inspired the Herald editorial utterances as above:

To the New York Herald: In your editorial article of October 6 you state that December wheat is at $1.90 and corn at 85 cents a bushel and cotton at 20 cents a pound. To produce either wheat or corn in the East at such figures with farm labor now demanding high war factory wages would bring a big producing loss to the farms, and instead of mortgaging his farm, which we don't propose to do, the farmer will have to let his farm land lie idle, only producing his own home wants. This will cause short production, and the public who are upholding high wage earnings, will have to pay for it.

The farm producer is certainly the goat when we have to pay 75 cents to 80 cents an hour for common farm labor. There never can be any reduction in our present high cost of living until we have a change in wage earnings and also a change in this extravagant, wasteful, reckless Administration of Mr. Wilson's, which has been the fountain head for higher prices.

I had a little plumbing work done at our farm. The bills total $56.95; material, $8.55; labor, $48.40; $1 an hour for helper, which we pay him as an apprentice to learn his trade at our expense. That's why building operations and rents have advanced. Until Mr. Samuel Gompers, our Mr. Woodrow Wilson's Assistant Secretary of Labor pro tem. (without portfolio), is made to understand that the American public will not stand his dictation, and that as foodstuffs come down wage earnings cannot increase but must decrease, the public cannot live as it is entitled to live. WILLIAM OSBORN.

Stelton Heights, N. J., October 9.

OUR New England correspondent reports: While the housing problem is being tackled in a practical way by several New England cities, Boston presents the spectacle of tearing down good houses to make site for the new yard and inspection shops for the elevated, the demolition of houses along the entire side of one street to provide space for an office building and the trimming away of hundreds of habitable rooms by the widening of a street. This further places a minus mark against the housing facilities of a city in which 6,500 families must store their household goods and double up with friends or live in hotels or boarding houses.

Fitchburg boasts of a housing corporation composed of manufacturers which has just completed thirty new double and single houses to be paid for on easy terms, and plans to build more in the near future.

A large number of mill operatives in New England will be idle for two days next week as a result of plans announced to-day. In addition, a silk manufacturing concern announced a 15 per cent. reduction in wages, a shoe factory was closed for an indefinite period and a cotton mill was shut down until Nov. 1. Two cloth and two yarn mills will be closed all next week and many others have been placed on a four-day schedule.

As retailers do not want to buy any more goods than necessity demands until they can know the future of prices, and jobbers and wholesalers are in the same position, it reacts on the manufacturers. Hence the moves noted above. They do not care to make goods for stock at current prices for raw materials and labor on the slim chance that they can sell later at a profit, so they are curtailing operations everywhere.

(*By Special Correspondence to* THE AMERICAN ARCHITECT.)

Seattle.—Many manufacturers, jobbers, architects and contractors are inclined to feel that the turn of the tide in building in the Pacific northwest is near at hand. It will not be possible to deal with future contracts until prices of some essentials strike bedrock, but that this readjustment is now in full swing is also felt to be true, with lumber leading. In that single commodity, at least, there seems to be little doubt that prices can go lower and the industry survive.

Shortage of production is still a vitalizing factor in preventing development of spring building projects. The jobbing trade is able to report a slight improvement in receipts of nails and small pipe, which has led in scarcity, but the difference is not sufficiently marked to warrant too much optimism. Bettered headway may not be possible until after the end of the year, certainly not until after the presidential elections, but restored confidence in building commitments predicated on 1921 is breaking forth through statements of architects who have already been consulted severally, through the increasing enquiry for fir lumber and shingles and with contractors.

Large jobbing interests that handle plumbing supplies, radiation, vitroware and enamelware, brick and cement are agreed that no improvement can be expected before the national political contest is over. It is without political tincture rather well conceded what the result will be, but investment in new building commitments seems to prefer to have the battle over and off the Pacific coast mind before a start is made. Following that, large jobbing interests are cautious as to how they express their hopes for next year. All depends on how rapidly prices are eased

to bedrock from which point it will be regarded as safe to rebuild.

The scarcity of cement is holding back the eastern demand for fir lumber. Both commodities now seem to be interlocked. Jobbers state they are unable to place a reason, that of car shortage having been nullified by the public statements of railway officials who repeatedly assert that the shortage is now history, and "spotting" orders on industrial tracks throughout the Pacific coast bears them out. Plaster is also short, and plaster board can be used as a substitute only in a limited way. There is plenty of brick, but without cement, plaster, galvanized pipe or enamelware architects and builders cannot follow the more optimistic mental condition of buyers.

An occasional small shipments of pipe reaches Pacific coast points, but one jobber expressed the condition when he stated that 100,000 feet of halves and three quarters would vanish overnight due to the stacked up back orders held by all the distributors. Large sizes are plentiful, but these are not now in demand.

Roofing is being offered to a surplus. Seconds in fir lath are $4, with standards at $7.50. Hydrated lime, due to the expense of packing and securing return of sacks, is being handled in this territory in 50 pound paper bags. Jobbers who have made the experiment report satisfactory results.

Jobbers of pipe, sheet metal and wire in this territory point out that war standards of gross margins of profits were permitted to remain for the North Pacific distributing territory, and that in consequence fall of prices will not be so radical as in other portions of the country, where margins were lifted as costs advanced.

The general building situation next year, as jobbers now view it, will depend largely on what farmers get for their crops. The action of the wheat market so far has not augmented the tendency of farmers to take up deferred building projects, and predictions are being withheld temporarily.

Fir lumber prices are steady. No. 2 vertical grain flooring is $64 at the mill, finish No. 2 and better 1x8 10 in. is $66 to $76, five eights by four No. 2 and better ceiling is $40 to $48, drop siding 1x6 No. 2 and better $41 to $51 and 2x4 dimension $21.50 to $25.75.

(By Special Correspondence to THE AMERICAN ARCHITECT.)

Chicago.—The keen attention which is being given to the immediate betterment of building is indicated by the number of conferences held in various cities during the past week.

From the reports of these conferences it appears that labor and transportation conditions have improved somewhat, but money is still unavailable for investment building, with bankers in general showing an apathy which amounts almost to complete indifference to housing needs.

According to the reports of meetings held in Chicago, no marked reduction can be looked for in the price of building materials, especially in products where labor and transportation costs constitute the entire cost of the product. Any price recessions that occur within the next sixty days will be made under pressure or in an attempt to stimulate the market.

Where a change of price is contemplated, dealers and manufacturers are urged to make the maximum reduction as quickly as possible.

Lumber interests assert that bedrock concessions have been reached in their line and any change will be in the nature of an advance. Retail lumber dealers report no great demand for lumber, and no improvement in the lath and shingle market. The price of lath has declined until it is now possible to buy lath at almost normal prices. Reported, clear red cedar shingles, Chicago base at $5.20 per sq. $5.60 per thousand, stars at $4.50 per sq. and $5 per M, No. 1 hemlock lath quoted at $10, No. 2 at $8.50 and No. 3 mixed at $7.

A declining tendency is noted in Southern pine quotations; mills are now in a position to fill any orders but as the demand is very weak, are piling up stocks.

Manufacturers of sash, door and millwork in general report little activity in their line, and no prospects until building picks up. Recently there has been some demand for storm sash and doors due to the approach of cold weather.

The window glass market is rather uncertain, and it is being whispered about that increased cost of materials and higher freight rates may mean higher price for window glass in the near future.

Chicago jobbers are maintaining their prices unchanged on steel products, and report a demand still keen enough to prevent any accumulation of stocks. The demand for wire and nails has diminished to some extent, but manufacturers report demand still far exceeds the supply, in spite of the fact that production and shipments have improved greatly.

A reduction of from 10 to 25 per cent. effective Oct. 1 made by a manufacturer of plumbers brass goods, presages a further reduction in that line, if the rumor of a drop in the cost of the raw materials entering into the product is true.